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A NEW
E S S A Y
ON THE
N E R V E S,

And the DOCTRINE of the
ANIMAL SPIRITS
RATIONALLY CONSIDERED;



S H E W I N G
The Great Benefit and True Use of BATHING,
And Drinking the BATH WATERS,

I N A L L
NERVOUS Disorders, *and* OBSTRUCTIONS:

W I T H
Two DISSERTATIONS

O N T H E
GOUT, *and on* DIGESTION,

W I T H T H E
Distempers of the STOMACH and INTESTINES.

By Doctor *KINNEIR*,
Physician at BATH, and Fellow of the Royal
College of Physicians at *Edinburgh*.

The S E C O N D E D I T I O N ;
With ADDITIONS; giving an Account of
some ALTERATIVE Medicines not commonly in Use;
and their Effects confirmed by Practical CASES.

L O N D O N :
Printed for W. INNYS and R. MANBY, at the West End
of *St. Paul's*; and J. LEAKE, at *Bath*.

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T O

RICHARD MEAD, M. D. &c.

S I R,

WHEN I resolved to offer the following Essay and Dissertations to the world, the Subject would naturally have led me to inscribe them to You, as the most competent and candid Judge of the Matters whereof they treat; had I not been likewise desirous upon this publick occasion of expressing my great esteem for Your Person, and my gratitude for repeated acts

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of civility and friendship, since I had the early honour of Your acquaintance, when You so remarkably distinguished yourself as Physician in *St. Thomas's* Hospital, where I received the first impressions of the Practice of Medicine and Surgery.

THERE are among the knowing and learned few examples of that humility and condescension which You shew upon all occasions to young Students, in receiving them with an humanity, which at once encourages them to a chearful prosecution of their Studies, and testifies Your own great concern for the improvement of Learning, and the good of mankind.

THE

THE world would readily join with me, should I here inlarge upon other parts of a character, not more universally known, than loved, esteemed, and admired: But whilst I forbear what the justice of the sentiments of the Publick have made needless on their account, and the modesty of your own may render offensive to Yourself, I am persuaded, Neither can condemn my taking notice of a quality which would have been unpardonable in me to omit, and to which I have been so much and so early indebted.

IF I have been so happy as to have given in this Treatise any
hints

vi DEDICATION.

hints for the Improvement of Physick, or to have offered any thing worthy of your approbation, it will be no little satisfaction to a person, who is, with the greatest respect,

S I R,

Your most Obedient

Humble Servant,

D. KINNEIR.

ESSAY

ON THE

NERVES, &c.

ANATOMY, and the general experience of mankind from their sensation of pain and pleasure, demonstrate, that all the solid parts of an human body, in the most minute points, are Nervous ; and, as such, they must proceed from the Brain, which is undeniably the source of all the Nerves of the body ; as appears from the observations of *Ruyfch* on the gradual alterations in an human Embryo, and from the Treatise of *Malpighius*, *de Ovo incubato*.

As the Brain, and consequently the Spinal Marrow arising from thence, enter so much into the composition of all the solid parts of the body (which is manifest from repeated

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experiments) it is reasonable to conclude, that all distempers whatsoever must affect the Nerves in some degree or other. The fluids, jointly with the solids, composing the body, there are cavities and spaces framed in those solids to contain the fluids: and those spaces must be such, and so ordered, as to allow them their due motion, and be subservient to the increase, nourishment and life of the Animal in a state of health, perfectly agreeable to all the appointments of the Creator.

THERE is a wonderful disproportion between these fluids and solids; the former exceeding the latter in the proportion of 3. 6 to 1, or almost as 4 to 1, and even the most solid as the Bones, lose above one half, as appears by experiment, which Dr. *James Keil*, in his *Essays on the Animal Oeconomy*, plainly shews. Hence it follows, that the causes of all disorders in the human body must be answerable to those proportions; *i. e.* the fluids must be so much oftener the cause of distempers, than the solids, as their proportions are to one another, 4 being more than 1. Hence likewise it appears, that the bulk of Animal bodies proceeds more from their succulency than their solidity.

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THE many surprizing Phænomena discover'd by the Natural Philosopher, in the prosecution of his searches, and in the course of various and repeated experiments, being the result of undeniable facts, put things beyond dispute, which otherwise would appear astonishing and incomprehensible to human understanding. Thus it is with regard to many things in the Animal Oeconomy, and the structure of living Creatures. But without entering into a particular detail of what seems yet unknown, or imperfectly explained in those matters, I shall only offer my sentiments, with regard to the Nerves; which I have chosen for the subject of the following Essay, because there hath been hitherto not much said either with sufficient reasons to convince the judgment, or with the least appearance of certainty, to determine men in the course of their practice, as occasion offers in Nervous indispositions.

ART and Experience have made many things clear, which were once in darkness. Who could, till the tryal was made, conceive the almost infinite ductility of gold? Who could ever imagine, that one ounce of fine flax or cotton may be spun out into thousands of yards of thread? Numbers of such experiments

might be mentioned to shew the endless divisibility of Matter ; but as this is infinite, so likewise is the cause which gave that property to Matter ; a property which our finite understandings, though not able distinctly to comprehend, do yet conceive to be possible, because our own experiments, that are only under a finite direction, discover to us a multitude of things which are strangely amazing, because utterly unknown before. Such a progress in discoveries, the effect of finite endeavours, makes us easily conceive the possibility of what we cannot comprehend, as being screened from our knowledge by the appointment of the All-wise Creator and Director of all things, who hath given us faculties, not adapted to let us into the real and absolute nature of things, but sufficient to instruct us into the relation that they bear to us : It is vanity in mankind, with not being satisfied without proving more than God intended, or thought fit for us to know, which has obstructed the improvement of Arts and Sciences, and introduced Scepticism into the world. Bare Hypotheses can never bring us to truth : instead of improving our judgment, and extending our knowledge, they generally serve to mislead the one, and confine the other. Diligent, exact,
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and well-weighed observations, founded upon the ocular demonstration of facts and experiments, are the only proper means to instruct and confirm us in the knowledge of things within our reach, and to assist our faith in such as are above our comprehension.

IT is upon this plan that the following Essay runs, being founded upon experiments, and on constant and faithful observations in the course of Practice, which hath verified the truth of the following propositions.

Prop. I. THAT there is a *Succus Nervosus* constantly conveyed from the Brain through the Nerves to every part of the body; without which there could be no sensation.

II. THAT the Animal Spirits so called, are not contained in the Nerves: But what can rationally be supposed to be meant by *Animal Spirits*, must be spirits existing in the blood only.

III. THAT the Nerves, in their structure and make, consist of innumerable fine threads spun from the brain, and in a manner collected and bound together in parallel lines, fitted, as does
appear,

appear, to perform their office in the way and manner of filtration, or as the rising of fluids in small tubes by attraction.

FROM hence it will appear what the *Succus Nervosus* is, and then a rational account will be given of its uses, and of the manner of its conveyance through the body, which will be followed with some observations, and an application of the whole to Practice.

THERE is so near a connexion between the first and second propositions, that they must be considered together, in order to explain the nature of the *Succus Nervosus*, and distinguish it from what is commonly understood by the name of *Animal Spirits*. For this end it is necessary to begin with a description of the Blood, the source of all the juices of the body. Now the Blood is composed of globules, that are red, swimming in the *Serum*, and forming a *Crassamentum*, when cold and out of the body: but is seemingly one uniform fluid, when circulating in the vessels and in a healthy state, tho' composed of particles very much differing from one another, and therefore is heterogeneous. Each globule is composed of fix of *Serum*, which appears red; and each of *Serum* divides

divides into fix of *Lymph*, and so on into different orders of an incredible smallness of imperceptible spheres, which *Leuwenhock* by his Microscopical Observations, and Dr. *Marten* in the Medical Essays of *Edinburgh*, Vol. II. have clearly demonstrated.

THE *Serum* is exactly of the nature of the white of an egg, as appears from the experiments of its coagulation by heat, which may be carried to the highest degree (according as the heat is augmented) beyond the standard of health or nutrition. All the principles of nutrition are contain'd in the *Serum*, which is capable of such a degree of fluidity, as to pass thro' the ultimate decreasing series of vessels; and therefore the nutritive Particles must be so very fine, as to exhale and become invisible: The last series of vessels which contain it being not discernable by the naked eye, this fluid, in order to pass them, must necessarily be reduc'd to that degree of tenuity, as to become no more the object of our sight, than Air.

WHEN the *Serum* of the Blood becomes *Lymph*, it is only by a further attenuation, as in the case of the white of an egg, when reduced to that fluidity, which fits it for the nourish-

nourishment of the *Carina* or *Embryo*, before maturity in incubation. As this cannot be brought to coagulate by any degree of heat, in such a condition as is mentioned, the same may be supposed of the *Serum* of the blood, when reduced to the like tenuity, perhaps much greater than that of *Lymph*, tho' Microscopes shew each globule of *Serum* to be made up of six of *Lymph*.

THE distribution of the *Lymphaticks* are every where throughout the body, and the most manifest of them, as the receptacles of a great many *Lymphaticks*, discharge themselves apparently into the *Receptaculum Chyli*, the *Ductus Thoracicus*, and into the *Subclavian Vein*, to dilute and cool the Chyle before it mixes with the Blood; and from what was said before, it is endued with properties very fitting for that purpose.

THE *Carotids* and the two Vertebral Arteries, one on each side, after dropping their thick and muscular coat, and entering the occipital *Foramen*, join all together, and make up an orbicular stem, from which proceed ramifications, which are variously woven, and curiously interspersed in the *Dura* and *Pia Mater*,

ter, and then lost in the Brain and *Cerebellum*. These supply the head with all its Blood, along with the two Arteries, which arise from the external *Carotid*, which passing through a single perforation, is distributed to the *Dura Mater*, and appropriated only to the thicker integuments of the *Cerebrum* and *Cerebellum*.

THE Brain then, as it is composed of two distinct substances, named *Cortical* and *Medullary*, is thus supplied by a full stream of Blood, and in great quantity continually flowing from the vessels above-mentioned: This Blood is lost in the course of circulation in the Cortical substance of the Brain, no way visible till it is again collected in the sinus's and ventricles, and discharged into the veins which return it to the heart.

MALPIGHIOUS says, That he finds, upon examination, the Cortical substance of the Brain to be an heap of small oval glands, which receive the capillary arteries and veins, with all their ramifications that belong to the Brain; and which send out an infinite number of fibres, that all together make up the Medullary substance, and the *Medulla spinalis*, from whence spring all the Nerves of the body.

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How far this assertion of an intermediate gland may be hypothetical or real, I shall not take upon me to determine; but I am apt to think with *Ruyſch*, that the whole proceeding from the arteries is vascular; and likewise, that their infinite small ramifications and evanescences may form a pulpy substance, such as the Brain, out of which may arise either a solid or a vascular thread composing the Nerves: But this will appear clearer hereafter.

BEFORE I proceed further to explain the first proposition, it will be necessary to say something of the contents of Animal and Vegetable Substances, so far as they can be known by distillation. For tho' these substances receive great variety of shapes and alterations by the power of the fire, and perhaps it may not be practicable to find out their principles in their pure and natural state, yet experiments in this way are not without their use in Physical explanations. The learned *Boerhaave* says, all such substances (excepting a few) are made up, 1. Of Water or Phlegm. 2. Of a volatile Fluid or Spirit. 3. Of a saline Matter, or Salt either volatile or fixed. 4. Of a fat Substance or Oil, otherwise called *Sulphur*. And 5. Of a brittle porous Body, or *caput mortuum*.

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THIS being a true Analysis of the blood, from whence all the juices of the body proceed, as is before observed, it remains now to analyse the Fluid, which the Nerves carry thro' out the body, commonly called *Animal Spirits*. Now by experiments the *Succus Nervosus* discovers (in a live creature as well as a dead one) a sweet, oily, mucilaginous taste, soft and of a clammy nature; these are properties and qualities very applicable to the doctrine of apposition and attraction, which constitute nutrition. And *Ruysch* in his *Adversaria* demonstrates the *Papillæ Nervosæ* of the skin, which distinctly appear in an injected part, to nourish the hair, as all the hair rises out of them. Hence it is evident that the Nervous Fluid is mere matter, which, as such, having no claim to sense, cannot of itself, being material, be the source of our senses: neither can it, for the same reason, be the Animal Spirits in the common meaning and acceptation; for this would be supposing mere matter to be sensible, which is an absurdity.

THE Animal Spirits are said to be good, when a person is lively, chearful, and capable of all Animal actions, in such a perfection as our nature will allow. But this is saying no

more, than that such a one enjoys a good state of health, whence ariseth that lively disposition. What is therefore meant by Animal Spirits, is not so much a production of the Animal substances, as the pure effect or result of a *Mens sana in corpore sano*. For there is such a reciprocal connexion and union betwixt soul and body, that the operations of the one and the other are variously determined, as either of them is affected. The very thoughts of a Man are differently disposed by the influence of the humours of the body ; and yet the soul hath some particular properties, upon which the body can have no effect ; as the body, in its turn, hath particular actions, not subject to the direction or command of the soul. These actions are called involuntary, because they appear so to us, as in the case of the motion of the heart ; which continues, without any attention of ours, as long as respiration lasts. And yet, when the heart ceases to move, the soul quits its habitation also ; which proves, that the soul actuates the heart distinct from our will, and that the soul's departure is not so much the cause as the effect of death, leaving the body only, when it is reduced to such a state, as to be no longer subservient to the dictates

dictates and operations of the soul according to the design of their union.

OUR thoughts and passions are involved in the very notion we frame of the Soul. Figure, Motion, and the Properties of matter, are comprehended in the idea of Body. And as the expression of good Animal Spirits means no more, than that they are the result of the just harmony between soul and body, as in a healthy state, they must be in a proportion to the mutual actions and sufferings of both of these: but how that comes about is, and probably will always be, a mystery to human reason. Nothing is more frequently heard or spoke of, than Animal Spirits; yet, as they are generally understood, they have no foundation in any Phænomenon that we know in nature; they make them a cause, and therefore they must exist: but this existence cannot be in the *Sucus Nervosus*, which (as hath been already said) being nothing more than mere matter, is neither sensible nor active; nor can I find their existence any where else in the Animal, in the sense wherein they are generally spoke of; so that, for my part, I can only consider them as an effect of that harmony, which flows
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from the connexion and consent of a sound mind and body.

WHEN a person is low, depressed, and labouring under the symptoms of an Hypochondriack, his pulse is slow, small and vermicular. This proceeds primarily from the state of the blood, which does not yield a sufficiency, either in quantity or quality, of *Succus Nervosus* to the Nerves, as to make us sensible of those pleasurable sensations within us, which occasion a brisk and lively disposition: but, on the contrary, the quality of the *Succus*, which partakes of the state of the blood, being secreted from it, is such, that it frets and vellicates the Nervous *Fibrillæ*; and the quantity thereof so small, that the Nerves are empty comparatively to what they ought to be. Hence arise those uneasy Sensations, Pains, fibrillous Spasms, &c. that Hypochondriacks usually complain of; and consequently all the Animal Oeconomy is hurt, and no secretion, or excretion, is performed as it should be; the appetite and digestion is impaired and lost, which occasions wastings and loss of flesh; the Sufferer also is fond of narrating his indisposition to every body, being
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under perpetual alarms of despair and a dissolution.

IT is certainly a gross error in Physicians, when they attempt the cure of such persons by volatile drops and spirituous medicines. The momentary relief which these give, only adds to the distemper ; for tho' Spirits, so far as they stimulate, and whilst the air and fire that is in them are rarefying, do refresh and attenuate, yet their after-effects prove that they condense the Fluids. This is evident in drinkers of spirituous liquors to excess, who are subject to aches, pains, obstructions, polypus's, palpitations of the heart, Nervous contractions, tremblings and subsultory motions, &c. Hard study, inactivity, and want of exercise, will produce the same disorders, as they condense the Fluids, and bring on an inflammatory state of blood.

OUR sensations were appointed to warn us of the disorders and dangers to which our bodies are liable. The usual motions that continually attend life, and occasion the circulations in Animals, are ordered by Omnipotence so, as to cause no sensations in us, in a state of health, that may prevent our forming ideas,

or obstruct our meditation and reflection. We should be otherwise under perpetual alarms, and the operations of the soul would be molested and disturbed. The body is altogether Mechanical, and the soul directs the motions of the Animal Machine, so long as this is capable of being moved, so long as the parts that make up the composition remain intire, and are fitted to act in obedience to its impulse, or as the dispositions of the Mind and Body answer to one another. For if we reflect on the difference in our manner of thinking when we are in the height of a fever, and when the distemper is removed; when the stomach is loaded or filled with a plentiful meal, and when we are fasting in a morning, we may by these relations, between the condition of the body and that of the soul, easily comprehend what influence our good or bad state will have upon our senses and imagination. The result of good health is life, vivacity and joy; and when a man's senses lie under no load or obstruction that may affect his sensations, such an one would be said to have good, lively spirits, as if these really existed in the Nerves, or elsewhere; whereas all that can be meant by that expression, is only the result or effect of health: which condition also is more conspicuous

spicuous in some than in others, in equal health, and that may be owing to a peculiar configuration and symmetry of parts.

IT would be absurd to say, that the sensitive faculty, called the senses, the imagination and understanding, are three different or distinct faculties of the soul; as the feet, hands, and head are three different parts of the body: for it is the same soul, the same thought, that proceeds in those different manners, which having different names assigned to them, have by that means come to be considered as so many different species of perception. Nor would it be less absurd to say, that joy and pleasure, which depend upon one of the faculties of the soul, *viz.* the sensitive, are absolutely produced by somewhat in the Nerves, or what is called Animal Spirits, or *Succus Nervosus*, which being intirely corporeal, can neither feel nor be sensible: so that without confounding our notions of materiality, we cannot suppose there are any such things as Animal Spirits (in the usual acceptation of the word) that can produce such effects, as have hitherto been universally ascribed to them.

SALT and Phlegm, being mixed, will make up a spirit. This I can easily grant to subsist in Animal bodies ; and it is in truth the only Animal Spirit : But to endow this Spirit with a faculty peculiar to the soul, is going beyond all reason. Yet how often do we hear it said, when an Hypochondriack is complaining of the severest pains and universal uneasiness, that his Animal Spirits are out of order ; a sort of cant of no meaning nor use. To say, in such a case, that the *Succus Nervosus*, or the Nerves themselves, are in a disorder, is speaking intelligibly, and is agreeable to experience and practice ; when a man's understanding is lost, or greatly impaired, and his reflection interrupted by whims and fancies, of which Hypochondriacks are full, these effects and symptoms plainly shew, that the Organs of sensation are hurt ; not the *Anima*, but the Nerves and Brain, by which the soul operates whilst in the body. That she makes use of these as her instruments, appears from observation and experiments : but the manner how is only known to the first Cause Omnipotent. “ The
 “ Investigation of the last and first causes in
 “ Metaphysics and Physics, is neither necessary,
 “ useful, nor possible to a Physician (says
 “ *Boerhaave*) ; but yet it may be maintained,
 “ that

“ that all is truly demonstrated in Anatomy
 “ and Chymistry mechanically ; as also in
 “ Physicks, so far as the simple and plain suc-
 “ cesses of experiments can prove.”

Though the soul exists of itself, yet whilst connected with the body, her faculties must (as is evident to every understanding) suffer in some degree upon the least error of constitution, she not being able to exert herself so well when the body is in a sickly condition, as when it is in a state of health. In her turn she acts likewise as strongly upon the body ; and we may daily observe astonishing alterations in the Animal, from the excesses of joy, grief, and fear ; the soul in such cases being so overpowered with transport or depression, as sometimes to occasion death, forgetting, as it were, her proper office, and putting a sudden stop to all the motions of the body. 'Tis the excess only of our passions which renders them hurtful ; they are rather beneficial when they are moderated, and move in conformity to the health of the body, wherein they exist.

The common notion of Animal Spirits, being thus exploded, and those appearances and effects usually ascribed to good Animal Spirits

existing in the Nerves, being shewn to be only the result of a *Mens sana in corpore sano*, it still remains to be explained, what Animal Spirits properly are, and where they are to be found. Now all Animal bodies yield a spirit or fire, and phlegm ; but as Spirit is nothing but salt and phlegm, or water, mixed together, such a Spirit subsists primarily in the blood of Animals. Activity or sluggishness are the consequences of this mixture ; and according to the combinations of these, and the predominancy of one over the other, the Animal is more or less vigorous and healthy ; for a Spirit in the blood duly composed, preserves the humours or juices from putrefaction, as it keeps up heat and motion in the circulating Fluids. After the first impulse given to form life, the motion of the heart and arteries is kept up or supported by the quantity and strength of a spirituous, elastick and expansive fluid, the Blood. As all the other juices of the body are derived from thence, so they have all a dependence upon one another, for the producing of health or sickness after they are separated from the blood, and come under their particular denominations for the purposes allotted them in the Animal Oeconomy. If the blood does not come up to the healthy standard of nature in
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goodness, so are the rest of the juices unfit for the support of health : For as a due consistence and proper quantity of blood are necessary to carry on the lively motions of circulation, so also a due tone of muscular fibres and others is requisite for the same purposes ; and this tone depends solely upon the blood and fluids, and can never suffer but by external injuries, unless the fluids deviate from that healthy standard of nature (as I have said.)

Hence it is evident, that what there is of an Animal Spirit in the body, must be made out of the blood ; and that the juices secreted from the blood, must only have such a proportion of that Spirit of the blood, as is necessary for their different uses. But as the exact quantity and degrees of tenuity of that Spirit, thus communicated to every different fluid of the body, cannot be determined, we must be satisfied with knowing, that of consequence it must be so ; this being not a bare Hypothesis, but supported on a good foundation. How far indeed our methods of trial and experiments, in finding out the principles of bodies, may affect and change the body itself, is a thing uncertain : nor can the exact differences between the fluids of the same person when alive, and when
dead,

dead, be fully known: It is however sufficient, that we are certain from experiments, that the blood is so composed, as is said above; which is further corroborated by experience in the curative way, when founded upon these principles. As for the *Minutiæ* of the Animal Oeconomy in the combinations of Fluids, which may be infinite, the knowledge thereof, were it possible to be attained, would signify little towards the cure of distempers. As long as the general principles are certain, a practice founded upon these, coinciding with just observations of the causes, effects, and symptoms of diseases, as well as of the nature, operation, and efficacy of remedies, is a sufficient light to enable a Physician to form his judgment of a case with some certainty, and to prescribe accordingly. Perhaps some persons may be apt to slight the profession out of a notion, that all they do must be guess-work, because they cannot explain the *intima naturæ*, and render them intelligible; not considering there are many things certain, though there are some unknown; that, according to the usual course and wise appointment of Providence, we have reason to think, that the knowledge which God hath qualified us to attain in nature, is more useful to us than what he hath secreted out

out of our reach, and is indeed all that is necessary for us; and that it is an impossibility, and down-right contradiction, that a finite understanding should comprehend all the works of Infinity; and that with regard to every thing in nature, even the most (tho' after all imperfectly) known, we have still reason to say, *Marvellous are the works of God, and past finding out!*

THE next thing proposed was, to shew the structure of the Nerves as they appear upon dissection, which may be different from what has hitherto been generally imagined of them, and how they perform their office. I took a section of the trunk of the Crural Nerve three inches long, and carefully stripped it of its external membrane, which inclosed it as a *theca* or sheath. This done, the Nerve appeared as a bundle of threads composed of many different bundles, each of these being inclosed in the same manner within its own *theca*, all lying parallel to one another, like so many small cylinders, slightly joined or sticking together by transverse fibres, running in an oblique direction up and down. This I observed in pulling them sideways asunder, when they separated the whole length of the section,

section, as threads of flax or cotton would do, sticking together without being twisted. Each of these threads appeared by the Microscope, to have an external covering or *theca*, and appeared transparent; for one, no bigger than an horse-hair, (which with a fine needle I divided into twelve distinct threads from the middle, without breaking one, to the end, holding by the other end of the section) resembled a tessel of fine flax at the divided end; and applying them to the Microscope, each of these divided fibres appeared as if solid, and very transparent, with many small fibres sticking out from their sides, which were those that connect the Nervous filamentary tubes together, and were torn from their sides in the separation. From all which I observe,

1. That all the Nerves are, in appearance, fine solid threads, spun or drawn out from the marrowy substance of the Brain and *Medulla spinalis*, and universally cloathed with a membranous covering from the *Pia Mater*; and they grow firmer in their progress after passing out of the scull and vertebbers.

2. That a certain number of those threads go towards composing a thread no bigger than
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an hair (and without all doubt to a greater and most inconceivable fineness) which, for distinction sake, I have called a bundle.

3. That each bundle seems to be contained within a sheath or *theca*, as appears in the experiment; and that every considerable Nerve or Trunk is a collection of many of those bundles, contained within its proper *theca*.

4. THAT each bundle so constituted, and collected to make up a considerable or visible Nerve, is connected by transverse fibres in an oblique direction; and also, that this order of covering, separation, and connection, may be the same in their most minute and undiscernible ramifications.

5. THAT all these bundles lie parallel to one another, as so many equal cylinders.

6. THAT the sected portion continued of the same length without shrinking, as other vessels do; as also, after dividing the bundles, they remained as long, even to the 12th division: but upon stretching them, these last became longer, and still remained so, without returning to their former length (as a hair will do).

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7. THAT they are strong and tough (which may be owing to their *Theca's*); for a filament no bigger than an hair, required a good pull to break it, which snapped at once without stretching, as a hair does when drawn to be broken.

8. THAT I could perceive a sensible elasticity in pulling the Nerve sideways, though hardly any longitudinally. This, I apprehend, proceeds from their common coverings or *theca's*, and the different bundles within receding from one another, which the oblique fibres that connect them will suffer them to do. This is more manifest in a trunk of Nerves, upon pulling the bundles sideways, after it is stripped of its outward *theca*, by which it loses its roundness and compactness, becoming flatter and more oval, even by lying on a board.

9. THAT as each bundle has its *theca*, or is, as it were, contained in a tube, and many bundles are attached together by fibres to make up a considerable Nerve or Trunk, it is thence evident, that there are cavities and spaces, even in a tubular form, all along the exterior body of a Nerve, or nervous filaments, which may be sufficient for the progress of the Ner-

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vous juice, and to carry nourishment to the Nerves, upon a supposition that they are not tubular themselves, which no discovery by the best glasses ever could make appear that they were: Yet that is not a good reason to say they are not tubular, since the curious preparations by injections of the best Anatomists afford us strong reasons to think that the whole body in its minutest parts is tubular. But let that uncertainty concerning the Nerves, with regard to their solidity, and their being hollow, remain uncertain, as I am apt to think it will ever continue so: tho' by what is attribute to the Nerves, would seem to favour both opinions; therefore I hope, by what has been said, and will follow from thence, some clearer notions may be formed, than what perhaps have occurred to others, from which some improvements in the practical part of Physick may proceed, and greater insight, by those that are more curious and learned, from the hints I have given.

WHEN any Nerve branches out, dissections shew that a bundle of filaments, with a *theca* inclosing them, divides from the trunk, breaking through the common *theca* of the trunk, as a branch of a tree does through its bark:

and as this carries it back along with it in its first progress, so does a Nerve; the moment it arises out of the brain, carries along with it a peculiar production of the *Pia Mater* as a covering: and then many of those nervous filaments spun from the *Medulla* being collected together, before they pass out of their bony cases, are covered with a stronger coat from the *Dura Mater*: and this seems to be particular to every bundle of Nerves (many of which constitute a trunk) before they pass out. As nature hath determined that each bundle of filaments, in its progress, should branch off to this or that particular part from the main trunk, so likewise it seems as if each of these branchings were determined, at their very origin, to this or that particular part of the body, since they arise distinctly out of the brain, and are so carried on till they branch off in the manner mentioned to every part and place of the body. For a large body of Nerves, or a nervous trunk, is like a rope composed of many threads, which may be divided from one end to the other into so many distinct threads.

THE whole Animal fabrick discovers a sort of sensibility in every, even the minutest point (as before-mentioned): and a Nerve is an ordinary

nary instrument of sensation, as appears from compression and a ligature upon a Nerve. When any part or member loseth its sensation, it loses at the same time all action and motion, and soon decays and grows small. In cutting a Nerve, there ouzes out from it a juice limpid and clear, which is a proof that they carry a juice, and therefore there must be hollow spaces, whether in the *theca's*, or in the filaments themselves, or in both, it matters not: But that they carry a juice is plain from experiments, tho' not perhaps in the manner as in sanguiferous or other tubes, they having no corresponding vessels, as the veins are to the arteries. Hence they may be said to be both secretory and excretory, as they convey a liquor which is prepared in the Brain and *Medulla*, part of which flies off in perspiration, and other discharges, and part returns to the blood and lymph again through the coats of the vessels, for animal purposes, to be explained hereafter.

THE medullary substance of the brain being of such a fine texture, so soft and delicate, as hardly to admit of the touch, without abrading some part of its continuity, the nervous filaments, at their first rise, must therefore be very tender,

tender, and they acquire no strength or firmness in their progress throughout the body, but what they receive by their connections and coverings from those two membranes, the *Dura* and *Pia Mater*. Those marrowy filaments also lying parallel to one another, cannot of themselves be supposed in any degree elastick; but the membranes that cover them, and the oblique fibres that connect them, being composed of elastick fibres, do easily account for consent, vibration, undulation, and the other Phænomena of the Nerves, which have hitherto been mis-explained, from a supposed elasticity in those soft filaments, and by groundless comparisons of a Nerve to a fiddle-string or cat-gut, than which nothing is stronger for its bigness, and its elasticity is owing mostly to the twist it gets in the making, as every Musician well knows.

THE idea we have of Elasticity, necessarily supposeth a firmness in the constitution of the body, which has extrinsically a power of restitution, when pulled or displaced by any power or violence. Now the composition of a Nervous *Fibrilla* is perfectly inconsistent with such power, and the experiment of my learned and worthy friend Dr. *Alexander Stewart*,
puts

puts it out of question. For making a section of equal lengths of an Artery, Vein and Nerve *in situ*, he found that the Nerve remained still of the same length, but the other two did not, and the artery shrunk more than the vein, as being of a stronger, firmer texture, and composed of more elastick fibres than the vein.

As all the tubes and hollow fibres originally arise from the heart, and all the Nervous *fibrellæ* from the *medulla* of the brain and spinal marrow, so they are wonderfully disposed, whether visible or invisible, throughout the body, mixed and interwoven one with the other, that, as before observed, not the least point thereof is found without numbers of both. For each miliary gland under the skin receives a Nerve and an Artery, and sends out a vein and an excretory duct or vessel, that serve to discharge the matter of perspiration, and by the *Papillæ nervosæ* being kept succulent, the hairs grow, and the *cuticula* is nourished and made moist, which becoming dry and over-heated, the sense of touching must be much impaired, if not quite lost.

Now a Fibre, in its ultimate division, is mere earth or dust, without *Æther* to join it,
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and make it what is called a Solid ; for such is the constituent of all Animal parts: and the firmness or cohesion of parts in a Fibre is effected by a fluid of the most simple elementary nature. For the *moles* of a body is form'd by the apposition of the most minute *corpuscula* into different shapes and forms, by the help or addition of fluids to make them cohere. This ultimate Fibre must be a solid, and by expansion resolves into the ultimate membrane, which curving, forms a cavity, and this cavity uniting, forms a tube ; all which increasing, form a body. Thus the first *stamen* is by assistance of a fluid unfolded, to the increase of a body, composed of flesh, tubes, solid threads, (if there are really such) blood and bones. All which, upon evaporation of their fluids, lose their cohesion, and become mere earth and dust.

HAVING shewn what a Fibre is in its ultimate minuteness, and what the Nerves are in their composition, very different from the other tubular structure of the body, so far as can be seen, (perhaps, what is not to be seen may be a solid, and may be a tube, as I have said ; but as I am only to reason upon what is discoverable) it remains now to explain in what manner it is most rational to think the Nerves do secrete
their

juice, conform to the theory founded upon the experiment mentioned before. Now the foregoing Mechanism of the Nerves induces me to think the manner of the distribution of the *Succus Nervosus* must be similar to filtration. Thus filaments, or threads immersed in a fluid at one end, will in a given time discharge at the other end whatever quantity of fluid is contained in the vessel, where they are immersed; and the operation in this way of filtration or distillation will commence the sooner, if the threads are wetted all over with the same fluid at first. This is performed by the attraction of the coherent particles of the fluid; which attraction is evidently seen in the experiment of pipes, of different diameters, immersed in any fluid; for those of the smallest bore will attract the fluid most, and according to them we find it to stand the highest. There is the same cause for the ascent of Fluids in threads of cloth by filtration. Now the attraction of a Fluid may be carried on in threads, whatever their position may be, without the assistance of other impulse; though it cannot be shewn in pipes, unless in an erect position, and that to a certain degree of height, whereas by the structure of a thread cohering together by side-fibres, the liquid moves on to the very

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ends of every division, (let them be innumerable or in what position soever) so long as there remains any liquid in the fountain.

THIS experiment of filtration by threads or cords is sooner and better performed by threads that are twisted loosely, and only so much as to make them form into threads, and those threads ought to be made of such a matter as is most soft and fibrous; and for this reason, threads made of cotton, as they will most easily form into such, are fittest for the experiment. Hence it comes, that the less they are twisted, there are the more spaces for the liquid to enter; for many of those cavities or spaces would be stopped up, were the threads more twisted, and possibly the cords may be over-twisted to such a degree, as intirely to prevent any filtration.

HENCE it follows, if filtrating threads lay, or could be made to lie, exactly parallel to one another, and were only connected by transverse fibres without a twist, the filtration would suffer in no respect, but go on without interruption; and the closer they were connected, the finer would the filtrated liquor be, that flowed from threads in such a direction. For
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take a cord compos'd of a great many fine threads of cotton ; twist them together, so much only as not intirely to hinder the filtration, and immerse them in water or a liquor of a red dye, the distillation will be limpid : but take a cord of the same bigness, composed only of two or three large yarns of cotton very loosely twisted, and immerse in the same liquid, the liquor will filtrate with its red colour.

Now, by the structure of the Nerves before-mentioned, it appears that they are admirably contrived for a constant uninterrupted filtration, as their filaments lie in bundles parallel to one another, and joined together without any twist, and inclosed in their *theca's* or sheaths, which emit transverse fibres for their connection in such a manner and contrivance that no Art can imitate, so as to prove the resemblance exact in every respect : but yet there is so strong an analogy betwixt the filtration in threads of cotton, and that in the Nerves, as appears from their structure, that it is very natural and easy to be conceived and allowed ; as attraction must carry on their secretion, when the impulse or force of the heart must be intirely lost before it reaches the infinitely small ramifications that prepare the nervous juice.

HEAT unquestionably is in a higher degree within the *cranium*, than any where else within the body, as appears from many things in Anatomy. And it is very necessary it should be so, where there is such a wonderful fine Fluid to be secreted as the *Succus Nervosus* is. The steam of every Fluid proceeds from its rarefaction, and that rarefaction is as the degrees of heat. Now, as the impulse of heat, joined with the diastole and systole of the Arteries, which form an action of pressure, are concerned in the nervous secretion, the filtration of this nervous juice must be in a proportion to those causes, both with regard to the fineness of the Fluid, and the celerity of its motion in and thro' the Nerves. The heat is in the blood, and the protension and pressure from the arteries within the *cranium*, and muscular motion without it. These are helps towards the nervous filtration, which are not found, nor can be experimented in common filtration. Thus the blood is rarefied in proportion to its own heat and motion within the vessels, since the impulse of heat in a fluid is the cause thereof. This heat is absolutely necessary to make the Nerves perform their offices; for the *Succus Nervosus* can only enter them when in a due state of tenuity, produced from the division
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and rarefication of the blood, in such sort as to pass all the smallest of tubes, which prepare it for that invisible nervous secretion ; so that of all the juices in the body this is, and must be the purest and finest, all the other juices moving in visible vessels and spaces, as injections do testify.

A single Nervous *Fibrilla*, just issuing out of the *Medulla*, though collected with others in bundles before they go out of their bony cases, always continues of the same smallness to its termination where-ever it happens ; that our sensations may be regular, and the consent of parts uniform and constant, through the uninterrupted filtration or progress of the *Succus Nervosus* keeping them in due order, which would otherwise happen, were they grosser in one part than another ; as the attractions of the particles of the *Succus Nervosus* would be different in one part of a *Fibrilla* being small, and another part of it being greater, as before observed in the ascent of water in small tubes, from their different diameters, it will rise highest in the smallest tubes. There are plexus's, knots or ganglions, as they are called ; but the *Fibrilla* must be the same in them, though it would appear otherwise, those only
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happening in such parts where two trunks meeting and joining in order to alter its direction sideways to any particular part, where it forms an angle of one sort or other; and this seems to be a general appointment of nature, where angles were necessary to be form'd in order to supply some parts with Nerves aside, that could not otherwise be by its first direction: And as all angles, in such a structure as the Nerves, might retard and obstruct their filtration or secretion, (from whence would follow great disorders) nature has ordered a looser connection of the nervous bundles in all those places within their common *theca's*, which makes a Plexus or Ganglion. These Plexus's may be ordered for other wise purposes in the Animal Oeconomy not yet discovered; but as they do not prove original *Fibrillæ* to be grosser in one part than another, but only that their bundles are more removed from one another in particular places, we may thence conclude, that as the *Succus Nervosus* is of the same tenuity and fineness in every part of its progress and filtration, it is also of the same nature as well when it issues out of the brain and *medulla*, as at the ultimate divisions and terminations of the Nerves; and this is to be
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considered of in a sickly state as well as in a healthy one.

As universal Sensation proves the universal distribution of the Nerves through every part of the body, as well internal as external, so, where they appear in greater abundance, as on the inside of the stomach, and under the nails, &c. the Sensation is more exquisite in those than in other parts ; so we see Anatomy instructs us clearly in their origin and structure, and shews us that they carry from the brain a fluid brought thither by the blood, and found by experiments to be the preserver and supporter of those organs of our senses the Nerves, for so ligatures and pressure demonstrate them to be, such obstructions destroying as well the sensations of a part to which it belonged before, as its capacity of action, occasioning wasting and decay.

BEFORE I proceed further to explain the nature and uses of the *Succus Nervosus*, it will be necessary to say something concerning the Animal Motions, by which life is continued. Now Animal life is preserved by a plain alternate motion of systole and diastole of the heart, that is, its contraction and dilatation.

'Tis

'Tis by this Motion of the heart and lungs, which is communicated thence to others, that all the fluids of the body are prepared and fitted for the increase and support of every part thereof; and these fluids so prepared, keep up that Motion constant and uniform, from whence health proceeds.

ALL these Motions within the Animal arise from the heart, the contraction and dilatation whereof keep the whole machine in order, provided they are uniform, and come up to the first standard of health. For whenever there happens any deviation from the perfection and regularity of that movement, there follows an error in the fluids, and then the solids are attended with complaints and loss of health in some degree or other; and all faults in the fluids, and disorders in the solids, affect the systole and diastole of the heart.

THE Heart of man, and of all living creatures, was at the first creation set in motion by God: but the Almighty's work being finish'd by the creating of Male and Female for the perpetuating the Race, this Motion hath been since deriv'd from the effects of generation. The movement was undoubtedly perfect in our first parents,

rents, who were designed to live without complaints or diseases; but that state of perfection lasted no longer than their obedience, which fell out before *Eve* was pregnant; and since that time none have ever enjoyed the like perfect health or happiness. Luxury and mixture have now corrupted our taste, which otherwise, by its sensations of pleasure and pain, would have distinguished that which it should seek from what it should avoid, as surely and exactly, as that of other animals, that have not been corrupted by the commerce of men.

As these two Animal Motions of contraction and dilatation of the heart depend chiefly upon the blood, the *Succus Nervosus*, and the action of the lungs, so the operation of this *Succus* upon the Nervous *Fibrilla*, should seem to assist or occasion the contractile, and the blood the dilative motion. For tho' extrinsically a fleshy fibre is contractile, and manifestly discovers a *Vis restitutionis*, or Elasticity, (as is proved by incisions on animals, as well when living as immediately after death) yet the heat hath no sooner left the body, but this elasticity or contractile power is evidently diminished, if not almost destroyed, in single fibres. So

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likewise, as the expansive motion or diastole proceeds from the blood, it must be conformable to the *impetus* and quantity of blood impelled into its receivers.

Now as the Nerves accompany all the arteries and sanguiferous vessels, so far as they can discern in Anatomy with the help of glasses, it is not unreasonable to think, that the same order is preserved through the whole body to their ultimate divisions; so that it is by the contraction and dilatation of the blood-vessels, and the heat of the blood, that warmth is preserved in the Nerves, and the secretion of the *Succus Nervosus* is promoted, otherwise the external cold would entirely destroy it. For the contractile motion of the sanguiferous tubes in the brain occasions a discharge of what they contain into the substance of the brain and *medulla*; which substances are more distended, and become more succulent by the systole of the arteries, and consequently by the diastole of those vessels the brain and *medulla* are pressed (as it were) so as to become less turgid, more empty, and fitter for the reception of the next supply, at which time the veins receive the returning blood, and the Nerves are filled with their juice.

HENCE

sweetish, oily and mucilaginous or soft nature. These are qualities very agreeable to the purposes of preserving those marrowy tender *Fibrillæ* (of which the Nerves are composed which are visible) in a proper tone for animal sensations and motion, as also for perpetuating the secretion of the juice in the manner hinted, constant and uniform, without uneasiness or disturbance to their sensibility. The opposite qualities of acidity, watery or thinness would produce painful sensations, and a too speedy and inconstant or irregular sensation, which must produce complaints and disorders of various sorts ; so that the soft and sweet quality of the juice seems to be the standard of nature for health. And as there is a great analogy between these qualities and the marrowy substance of the brain, with regard to appearance and taste, it is not improbable that this *Succus Nervosus* nourishes the Nerves, as well as keeps them in a proper order for their functions. In like manner as the *Succus Nutritius* is carried by the evanescent arteries to the fleshy parts, so is the *Succus Nervosus* carried by the evanescent Nerves to the nervous parts, both being found every where ; the redundancies and superfluities of either are perspired, and make up the perspirable matter.

As

As the juice is that nourishes, so will that part be that is nourished thereby, in point of taste in a great measure: thus we find in the brains of animals a soft, sweet, and clammy taste; and in all the most Nervous parts, a greater delicacy of taste than in any other. Such being the analogy betwixt the *Succus Nervosus* and the *medullary* part of the brain, it is natural to conclude, that it is the *Succus Nervosus* that nourishes the Nerves, *Medulla Spinalis*, and the Brain also.

THIS Doctrine is still more confirmed by what occurs to daily observation, particularly in all Paralytick disorders; for whenever any member loses sensation, it not only loses motion, but also decays and grows smaller; being not so full of juice, by reason of the defect of the *Succus Nervosus* in the Nerves of the part, it necessarily becomes smaller; and because the Nerves are not nourished, it withers and decays, tho' the circulation of the blood still subsists in the part. These facts plainly prove the obstruction of the Nerves of such affected parts, when it happens, as experiments do, that a ligature upon a Nerve will destroy all sensation below it, so far as the branches of the Nerve are emitted.

THERE

THERE is an objection made to the perviousness of the Nerves ; and those who started it say, That were the Nerves pervious to any juice, the Nerve that is tied would grow bigger, and swell above the ligature, as other vessels do, agreeable to the direction of the fluid therein moving, from whence they hastily conclude, that a Nerve has in it no juice. But this objection arises only from a mistaken notion of the structure of the Nerves, which are not altogether like other vessels, visibly hollow like tubs, with a quick circulating fluid in them ; and this difference prevents their swelling above the ligature, as others do ; for the Nerves, as before described, are not visibly canalar, but that a juice passes them in the manner of filtrating threads by the laws of attraction : this removes the objection, and accounts also for the Phænomenon whereon it is founded. For a Fluid moving on cords by attraction of particles, will move no longer than the contact lasts, one drawing on another to the end : take that off by compression or ligature, all below will run off, and the threads grow dry, and all above will remain as at first when the ligature was tied, without further distention or tumor, as the motion cannot be carried on longer than by the attraction being

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continued by contact ; therefore by intervention of preffure or ligature, that is taken off, and there is no more drained from the fountain, the threads remaining the fame, no fuller than at first : Whereas in distractile canals the contrary will happen, where the vessels are capable of a large distention, and the fluid, as in the blood-vessels, is set in motion by the force and impulse of the heart.

MANY notions and reasonings about the Nerves, I allow, must be hypothetical, where all is not discernible, as in other parts of the animal body ; but in such cases where facts, experiments and observations are wanting, we ought to reason by analogy, without which all hypotheses are uncertain : for forming hypotheses without attending to facts, is often the production of error, and apt to mislead, in place of clearing up a point, and consequently can be of no service or use to mankind ; for it is good to our fellow-creature, which ought to be the end of a Physician's knowledge, and the rule to direct him in his researches. If we cannot with all our faculties discover the absolute nature of things, we can still find out the relation which they bear to us, and their tendency either to preserve or obstruct health.

If

If we know not the seat of the soul, or the manner of its operations on the body, (which if we did, would still be of no service to us, nor enable us to make it act otherwise) we at least know, that the Nerves are the chief instruments which the soul, whilst in the body, employs for the display of its faculties; and it is sufficient for us to know so much of the instruments as to be able to assist them when unfit for the impression of the soul; and more than this Providence did not intend us to know, or qualify us to discover. When a man is in pain, I know some Nerve is hurt and affected: when he has lost sensation in any part, I know the Nerves of that part are obstructed, and want the juice necessary to preserve them in their tone and order, which fit them for communicating their impressions to the soul. When I find any one labouring under madness, convulsions, epilepsies and lethargies, I know that the *Genus nervosum* is hurt; and rationality being destroyed with involuntary motions, and suspension of action, I conclude in general the brain is affected, as all the Nerves arise from thence.

ALL this in general, and much more may be learnt from Anatomy, Observation and Experi-

periment: tho' why fuch caufes fhould produce fuch and fuch effects, and why the Nerves fhould be the feat of the foul's government more than any other part of the body, and the instruments of its actions; thefe, I fay, be, like the other *intima naturæ*, above the reach of human reafon; fo that fearching after them arifes from an unwillingnefs fome men have to allow of any thing they cannot account for; this is but mif-fpending of time, which may be employed to a better purpofe in uſing and improving the light we have.

THE Observations ariſing from this light;
That,

1. THE Nerves are the instruments of all our ſenſations, and operate either pleaſurably, or otherwiſe, according to the condition of the *Succus Nervofus* which they contain.

2. ALL voluntary and involuntary motion depends intirely upon the Nerves, and a ſuitable quality and quantity of *Succus Nervofus*.

3. An error in the ſtructure of the Brain and Nerves, and a fault in the quantity or quality of the *Succus Nervofus*, are the occaſion of all diſorders, properly called Nervous.

4. THE Nerves of themselves are lax, soft, and composed of marrowy fibres, having no elasticity, continued from their origin, constantly of the same length and size to their evanescent extremities or terminations.

5. THE Nerves may be distended, and suffer a *Plethora* from a too great quantity of *Succus Nervosus*; and the contrary may happen from too little. The first produces tension, the latter relaxation; but this is to be understood laterally only, as proceeding from their *theca*'s, and the transverse and oblique fibres, that arise from the *Dura* and *Pia Mater*.

6. THE Nerves absorb the *Succus Nervosus* in a manner analogous to filtrating threads immersed in a fountain, which proceeds immediately from the brain; and that this juice is the finest and the most of an elementary nature in the whole body, when fittest for the animal purposes.

7. THE qualities discovered in the *Succus Nervosus* shew it to be fitted for nutrition and supply of waste to the Nerves; and perhaps it may serve to other noble uses as yet undiscovered.

8. As

8. As there is a supply of *Succus Nervosus* brought to the mouths of the Nerves, and wrought up or secreted in the brain, as constant as the circulation of the blood thither, so consequently the secretion of this juice in the Nerves must be in a *ratio* to the quantity separated from the blood ; and the good or bad offices of the juice must be in a *ratio* to both quantity and quality.

9. THE quality of this juice, good or bad, depends upon the state of the blood, and the quantity is in a *ratio* to the slowness or quickness of the blood's circulation.

10. THE Nerves are pervious at their beginnings and terminations, both for carrying off the superfluity of the juice, and also preserving their ends moist, and in due tone for the sense of feeling, as remarkably appears from the plentiful distribution of them under the nails and *cuticula*.

FROM these observations we may account for various experiences and effects that we see and feel.

1. WHEN a man is wounded in any Nerve, he feels an exquisite pain, and the wound weeps a clear limpid liquor; the action and motion of the part to which it belonged is hurt, with a numbness and pinchings all below the wound; and the part never recovers intirely that strength and exquisite feeling that it had before, but is often chilled and feels cold, and always more susceptible of the impressions of air and weather. *Ob. 1.*

2. WHEN the Nerves are fully distended with *Succus* of an healthy condition, pleasure follows, with joy, liveliness and activity. But if the *Succus*, tho' conformable to the standard of health, be not sufficient to fill them, then sluggishness, inactivity, drowsiness, impatience, sinkings, and all the symptoms attending relaxation of fibres. *Ob. 1.*

3. IF the *Succus* in the smallest degree partakes of an acrimony, whether it be a sufficient quantity to fill the Nerves or not, insufferable pains will now and then ensue, with startings and subsultory motions, convulsions and spasms of particular parts, as the Nerves subservient to those parts are affected or vellicated; with intervals of vivacity, if the *Succus* is in sufficient

cient quantity, and intervals of depression, if the Nerves are not so succulent as they should be. *Ob.* 1 & 2.

4. IF the Nerves proceeding from the eighth pair be tied, or cut across in the neck, the motion of the heart grows languid, a palpitation ensues, and the motion in a little time ceases, and is intirely lost. *Ob.* 1 & 2.

5. IF the recurrent Nerves are cut, the voice is destroyed, as appears from experiments. See Dr. *Martin's* experiment on a little Pig, *Edinburgh Essays*, where, tho' the Pig continued to suck the Mother, as the rest did, it languished, and in a short time died. The case is the same with muscles; when the Nerves belonging to them are cut, action and its power ceases. *Ob.* 1, 2.

6. IF the brain is hurt or bruised by a fractured scull, and its texture in part destroyed by contusion, extravasation of blood, a bad formation, water lodging in the ventricles, inflammation of the membranes, and a *Pletthora* in the sanguiferous vessels, the consequences are, a deprivation of all sense, stupidity, coma, apoplexies, epilepsies, vertigo's, deliriums, folly, exquisite head-ach, &c. *Ob.* 3.

7. IF

7. IF the flesh feels soft and loose, all the circulations are languid, except when a fever comes on, and then the pulse discovers a paucity of juices, or visciditv in them ; the Nerves contain little *Succus Nervosus*, and consequently are not distended ; the vibrations of the lateral fibres upon the marrowy nervous filaments, are imperfect or irregular : whence flow universal uneasiness, imperfect sensations, and a suspension from pleasure and joy ; instead whereof succeed gloomy and dismal apprehensions, syncope's, loss of appetite, indigestions and flatulency. *Ob.* 1, 4 & 5.

8. WHEN a person is of an athletick habit of body, strong and hard flesh, full of blood and juices, a *Plethora* in the Vessels and Nerves is discovered by *Catalepsis*, or sudden falling down, spasms and convulsions of all sorts, violent Hysterical fits with uncommon strength, *Tetanus*, *Priapus*, *Furor uterinus*, Frenzy, *Chorea sancti Viti*, an intire loss of rationality, with all involuntary actions. Several sorts of convulsions happen also in cases of inanition ; but as these proceed from a fulness in one muscle or fibre, more than in the antagonist, it is reducible to the same head, tho' cured differently. This, as well as the foregoing example,

example, is occasioned by the different degrees of elasticity and vibration of the fibres, intermixed with the Nerves of the *Pia* and *Dura Mater*.

9. THE delicate fineness and texture of the Nerves implies, that the fluid they contain must be composed of the most exquisite small particles, like to a fine vapour arising from an high rarefaction; this, with the qualities discovered in it, seems to fit it, as was said, for nutrition and apposition; and its progression being carried on slowly by attraction of particles in a constant uniformity, convinces us almost of the certainty. *Ob. 6, 7.*

10. THE succulency of the Nerves in a healthy man, depends upon the goodness and due quantity of the blood, that enters the vessels of the brain: For the blood is rich in proportion to the quantity it contains of such a fluid, as is secreted, or can be secreted by the brain, and thence into the Nerves; and also to the quality of the blood, which can produce no inquietudes or unhealthy symptoms. *Ob. 6, 7, & 8.*

11. THE

11. THE quality and quantity of our blood (from whence all the juices of the body proceed) depend upon what is taken into the body, or the fix Non-naturals, *viz.* air, meat and drink, motion and rest, passions of the mind, things contained and discharged, sleep and watching. A right or a wrong use of any of these non-naturals, occasions a good or a bad state of health, and consequently the requisites for good juices, as they all flow from the blood, depend intirely upon them. But whatever qualities the nervous juice derives from a wrong use of any of those, it is only the excess of those qualities and quantities of the blood, that produceth distempers; for neither will a bitter, a sweet, sour, acrimonious, saline, &c. in due quantities, alter the juices in their healthy standard, so as to render them unfit for circulation, and their respective uses in the Animal Oeconomy. *Ob. 9.*

12. THE innumerable visible, and, without glasses, invisible terminations of the Nerves, as under the *cuticula*, (which *Ruysch* has described) nails, inner-side of the stomach, and guts, &c. with the *mucus* that constantly appears there, when there is no obstruction, shews beyond contradiction, that some of the
nervous

nervous juice is discharged by those terminations, and a driness and parched condition of parts, is a proof of the want of perspiration of that *mucus*, which might otherwise keep them supple and moist. Thus, when the orifices of the *Papillæ nervosæ*, or *Pyramidales*, as they are called, under the *cuticula*, are not obstructed, there is an oleaginous, shining moisture upon the skin, which is certainly a perspiration; and this I call the insensible and steamy perspiration which proceeds from the Nerves, as I think the sweat proceeds, and the more sensible perspiration from the serous vessels, which branch off from the evanescent arteries in the skin. *Ob. 10.*

IT still remains to clear up those observations and practices, and in order thereto, the following propositions must be laid down. As,

I. THE Fluids of the human body, in regard to their quantity and quality, arising from various alterations and dispositions receding from an healthy standard, are productive of distempers. In some people the blood may be more disposed (if I may say so) to certain kinds of humours, than in others, under equal directions in the Non-naturals; and in this disposition

sition there may be as great variety as there is of faces. This variety is the reason why there can be no specific remedy, nor particular diet effectual in all cases; for similar distempers require different methods of cure in different persons, it being evident from daily experience, that one medicine will be of service to one, as well as one method of diet, that are hurtful to another in the same case. This Idiosyncratical part of knowledge is not always so much attended to as it ought, being of the greatest use in the curing art, and very frequently exemplified, particularly in the effects of Opium, and in many eatables or alimentary things. The same may be observed in many other medicines, as *Castor*, *Succinum*, *Aloes*, *Rhubarb*, &c. if Practitioners would turn their minds that way, or to find out the constitutional antipathies of the diseased, there could not happen so many unsuccessful advices; then (instead of gratifying a natural propensity to subject all cases to their one favourite medicine, and all causes of distempers without distinction to gluttony and intemperance) the *opprobrium* would not lie so much upon the profession as it does: For,

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Prop. II. CONSTITUTIONAL Antipathies are not to be accounted for any more than the dissimilitude of persons or things, in all respects; and as this wonderful diversity is discernible in all the known parts of the creation, so that no two persons or things are exactly alike; so likewise is it in distempers of the same kind, which differ in shape and symptoms according to the diversity of constitutions. Hence flows the necessity of an exact knowledge and attention founded on the histories of distempers, and faithful observations, to make a good Physician.

Prop. III. THE combinations of the Fluids of the body, with regard to health and sickness, are so various as not to be determined. This variety of mixtures produces different qualities, that may either preserve or destroy health. So likewise in point of quantity, the proportions may vary and conduce to the same purposes; this variety of combinations may be almost infinite, and plainly shews, that health and sickness do not depend in all persons upon the same point, no more than the recovery of different people in the same case does upon one and the same method and medicine.

Prop. IV. THE alterations in the juices of the body consist in the increase or diminution of their bulk in their particles, as to their solidity and size, shape or figure; and likewise as to their flexibility, stiffness, elasticity, their various cohesions, and mutual attractions, so as to be easily or not easily divided.

Prop. V. NOTWITHSTANDING the many distinctions that may be made or happen to the Fluids of the body, yet it is not, perhaps, necessary to know them further, in point of drugs, than that by their too great attractions and cohesions they may obstruct, and by a too great fluxility may fly off in too great quantities. For in such cases it is, that the greatest benefit may be expected from medicine, whereas the qualities of bad juices are more readily corrected by Mineral waters and Bathing, with proper food and diet.

Prop. VI. THE acrimony of the juices of the body differs according to the modifications of the particles of different salts that impregnate them: and as the *Succus Nervosus* comes originally from the blood, it must partake of the good or bad principles arising thence.

ALL diseases incident to mankind, arise from some of the causes and their effects mentioned in the foregoing Propositions ; and all methods of cure are conducted by discharges, as bleedings, purgings, promoting urine, and increasing the insensible perspiration ; by attenuating, stimulating, vomiting, dilution and thickening ; and, in fine, by every thing that increases or diminishes the circulatory motions, so as to bring them to the true standard for accomplishing all the animal functions necessary to a state of health.

ALL Mineral Waters and Baths, with proper advice in premising and jointly using some one or other method along with them, as the case requires, are useful in a very high degree towards a recovery from every disorder, in which there is no decay in any bowel by loss of substance, ulcers, fevers, and the like : and there are some in most countries in the world fitted for different purposes and distempers. We may analyse mineral waters, and find out the most predominant minerals with which they are impregnated ; but still there are such nice combinations of them, work'd up in the bowels of the earth, that all and every particular mineral, in their due proportions, can
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never, in a great many of them, be found out by experiment. So that at the first discovery of a mineral spring, no man can positively assert what it is good for, otherwise than in general terms; for experience can only shew in what particular cases it may be of service.

To instance in the waters of *Bath*; it is generally allowed, and proved by experiment, that they are impregnated with Steel, Sulphur, and some Nitre. We know all the properties of each of these ingredients, and yet no art can combine them together in any menstruum or water, in such a manner as to produce effects like those of the *Bath* water. There are in them such fine volatile parts, that fly off very quickly, which both internally and externally are capable of passing into the minutest absorbent pore. Their heat and volatility contribute so much to their quick effects, that it is immediately felt in the stomach, and, like to a warm cordial, stimulates the nervous filaments into agreeable sensations, and immediately passes into the smallest vessels, thereby performing surprizing cures, particularly of all such cases as are truly Nervous, and such others, as arise from obstructions, and a languid circulation.

Prop. 4, 5, 6.

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My intention in this short Essay was not only to clear up, in some measure, the doctrine of the Nerves, and remove the prejudices entertained against the profession of Physick, through the want of something being made out upon that subject, more intelligible than what has hitherto appeared concerning the Nerves and Animal Spirits ; but also to shew the usefulness of drinking the *Bath* waters, and particularly of Bathing in most cases, as well of hot as cold bathing, whose effects daily experience proves to be successful in most nervous cases, that are curable ; and those effects may be rationally accounted for, from what has been said in this Treatise.

Now, in all Paralytick cases, the Hot Bath should be first used ; and if the proper use of it (as in curable cases it seldom fails) doth not procure a cure, then the Cold Bath should be tried ; for though we sometimes find that neither will succeed, (as there are incurable palsies) yet histories of undoubted credit, and daily experience at *Bath*, prove indisputably, that many are continually cured by both. Sir *John Floyer* and Dr. *Baynard*, in their treatises of cold bathing, have given sufficient evidences of its good effects. The many trophies and
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gifts left behind at *Bath* by such as have there been cured by using the Hot Bath, are undoubted testimonies of its efficacy, every day to be seen in that place. So what could be the occasion of its being so much disused of late, or what could be the motives of some Physicians endeavours to discourage the practice, is not easy, or not agreeable, to conjecture. But I may venture to say, that there are but few Chronical cases, where bathing with proper directions, joined with drinking of the waters, will not be of service; always excepting some head cases and hecticks arising from decayed bowels, by ulcer, impostumation, &c. and over-heated blood. Some cases, where bathing has been positively forbid, and otherwise managed by my orders, have succeeded to my desire; and there are many instances in books of the success of bathing, and daily proof thereof, to be seen in this place of *Bath*.

It may perhaps appear strange, that an hot and cold Bath, two methods that seem diametrically opposite, should both concur to effect recoveries in the same cases, as experience testifies. But as there is no arguing against matter of fact, so this will create no difficulty to a person that knows the anatomy of the parts upon
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which they operate (*viz.* the *cutis*) and the due motions by which we are kept in health, as illustrated in the foregoing theory.

THERE cannot be two principles more opposite to one another than heat and cold, and consequently their effects should be so too. Heat softens, lengthens, and expands; but cold hardens, shortens, and contracts, as is evident in iron chains in hot and cold weather: now cold hardens the skin, which heat softens; and lessens the diameters of the pores, which heat increaseth; so that it looks as if the effects of the one should destroy those of the other; and this indeed is certain, so far as it relates to the *cutis*, or skin.

BUT before I proceed further upon this subject, it will be necessary for me to observe, that I think most, if not all distempers, wherein this method of bathing either in the hot or cold Bath is useful, proceed from an obstructed perspiration; and that perspiration may be lessened or obstructed, either, 1. From the quality of the perspirable matter, in visciduity and thickness, cohering too strongly with the juices of the body, and is not discharged through their excretories, as before hinted. And, 2. From

an hardness, contraction and driness of the pores of the skin, that when the perspirable matter comes to be discharged, it cannot pass, where it accumulates and grows thick, forming obstructions in all the outlets, and also a compression upon the extremities of the vessels and *papillæ nervosæ*, which prevents it intirely, and by consequence a fulness of vessels and all its consequences must ensue, unless the redundancy is carried off some other way. As perspiration may be stopped by the one as well as the other of these causes, so that obstruction may be remedied by means widely differing from one another. For instance, The Cold Bath upon immersion so shakes and compresses the whole nervous system, that even the minutest capillaries feel the influence; and the pressure, with the sudden chill, produces such an *impetus*, as to crisp the fibres, and force open the smallest passages. By this means the velocity of the circulating fluids is increased, and the impending load discharged through the pores of the skin; and instead of keeping back the perspirable matter, which had contracted such qualities as to occasion the various complaints for which the Bath was advised; the frequent dippings freely dislodge what affected the nervous termination with uneasy
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and painful sensations ; so that after bathing, one is brisk and lively, and feels a lightness and agility of body, as oft as he repeats the practice, by which we find the motion of the blood is accelerated, and the *Succus Nervosus* duly diffused through the Nerves, from an increase of pleasurable vibrations, and a recovery of the decayed spring in the muscular fibres and vessels.

It is true, that through a misunderstanding either of the case or the method of operation of cold baths, they have proved often unsuccessful, and even prejudicial to many people, when prescribed ; but this may be accounted for by observing, that there may be often something peculiar to the constitution or case, that may forbid the use of those baths, such as corpulency, unsound viscera, the spring of the vessels worn out with old age and debauches, and also too great a load of thick viscid humours, so impacted, that they cannot get thro' the skin. For if the fibres are so stuffed round, as in fat people, that they have not space to play, vibrate, or contract, being so much on the stretch, the sudden squeeze or impulse of the Cold Bath can have no effect, but will strain them to no good purpose, and perhaps

tear, and consequently weaken them. For whenever an effort is made to remove any thing by an elastick body, if the first exertion fails, every *impetus* afterwards languishes, and the spring is hurt or spoiled: and in unsound viscera, or when any part is much weaker than the rest, such an additional force will press the fluids upon those parts greatly to its hurt, by either bursting the vessels, or promoting the flux of some vitiated humours upon them, which otherwise might be discharged some other way. For this reason it may be said in general, that in most cases where the Cold Bath can be of service, it is still safest to begin with the Hot Bath, and finish with the Cold, if necessary. For, as I said before, except in some rare instances, there are very few cases, especially in Chronick diseases, wherein the hot mineral springs will not produce surprizing good effects and recoveries, when the most efficacious remedies or medicines have been long used in vain. And as there is no danger in the Hot Bath at first, where it is properly advised, and there may be some in the Cold, and as in similar cases, they both have good effects, I would recommend it to every body, as a general rule, to begin with the Hot, as the safest way; and if the cure be not thereby

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completed, then to try the Cold, by which method he will run no risque, as has been already observed.

To explain the operations and effects of the salubrious and efficacious springs of the city of *Bath* in *Somersetshire*, from their component parts, would require more Physiology than I am master of, and, as is said before, the combinations of mineral fluids, work'd up in the bowels of the earth, are so nice and various, that it is impossible to analyse them exactly by any experiment whatever, or to fish out every individual part in their true proportions: Let it suffice then to observe what is most predominant in them, and to reason *à posteriori* from their effects. That there is a steel in the *Bath* water, is very perceiveable by the taste; and it is otherwise evident, that it greatly abounds with a volatile mineral sulphur, which soon flies off and evaporates, being intirely lost upon growing cold. The mineral matter with which this water is impregnated, from its effects may be said to be a soft, deobstruent, and subastringent Balsamick: subastringent implies a salt in the composition, and sulphur is never to be met with, even in the sublimed flowers, without some portion of salt, which,
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when boiled in oil, as in making the balsamick sulphur, shoots like needles, or the branches of *Sal Armoniac*. Hence we may reasonably conclude, that the waters, in their subterraneous course, must bring a salt along with their sulphur, since this last is never found above-ground without the other; and more especially, as water attracts such particles, and is a more natural *menstruum* for saline bodies, than for those that are purely sulphureous. They may be compared to a fomentation, which both relaxes and stimulates the parts all over the body at once, and by undulating and strengthening the fibres, the vital motions are increased, tho' ready before to be at a stand. Thus, in Paralytick cases, pains, aches, contractions, humours stagnant and fixt, furring of the vessels by gouty matter, and in fine, in all distempers arising from acrimony and pungent salts, from obstructed perspiration, and obstructions of the bowels, excretory and secretory glands, the Nerves not performing their offices for want of a due supply of *Succus Nervosus*, &c. I say, in all those cases, drinking the waters, bathing and pumping, as the case requires, will be of the utmost service, and have succeeded when all other means availed nothing.

BATHING

BATHING all over, more especially the head, and standing over the springs, do wonderfully open that almost infinite number of excretory orifices upon the surface of the skin, and clear those cutaneous ducts, by softening and dissolving what matter may be therein accumulated, and thickened or crufted, thereby causing the obstructions. These breathing ducts being open, and the impacted matter dissolv'd, way is made for the fluids and solids to perform their parts, and return to their healthy standard. The water inwardly taken, and directed for the cure of inward obstructions, and debility of fibres, such as weak stomachs, worn out with luxury and debauch, gout, and illnesses of a like nature, cholick and dry gripes, distempers of the kidneys and urinary passages, and in fine, all Hypochondriacal and Hysterical illnesses, flatulencies, spasms, &c. I say, the waters drunk at the pump in small quantities, and under the direction of an honest Physician, joined with bathing in them at proper times, will have surprizing success in these and most curable Chronick cases: but without bathing in them, many, whatever illness they labour under, (which does not reasonably forbid it) will find a slow progress in their amendment, as is evident

dent from daily experience. Bathing indeed hath of late years lost its credit in the opinion of some of the Faculty, tho' in the first ages of the medicinal appointment of the *Bath* waters, the sole dependence was upon bathing, drinking of them being in disuse for a long time, till the late Dr. *Guidot's* time. Thus people have been taught to despise and neglect a natural and simple method of cure, provided, as it seems, by Providence, for the general relief of mankind, under the most ordinary distempers to which they are subject, and warranted as well by the continued experience of all past ages, as by ocular demonstration in the present. How this experience comes to be slighted, and why the use of bathing is now so much dissuaded and neglected, may not perhaps be a proper inquiry. I never saw a good reason assigned for it; and where conjectures may occasion reflections, they ought not to be indulged.

WHOEVER knows the structure of the *cutis* or skin, and considers how many distempers are brought upon us by an obstructed perspiration, and with what readiness and ease this is restored by bathing, as is evident from daily experience; whoever, I say, considers these things,

things, cannot, with any shew of reason, dispute its good effects. Besides the relief it gives barely as a fomentation upon the external parts, in moistening, softening, and washing away all the filth and morbid matter, that may lodge in and obstruct the pores, there is also a medicinal virtue conveyed into the blood by the absorbent vessels in bathing, which will have quicker and more immediate effects upon the capillary vessels, and the fluids contained in them, than drinking the waters can have; for before it can have any effect upon those more remote parts, a long time must be spent in the course of circulation, and consequently the virtue of the water must be lost to a great degree, before it can arrive at those extremities of the vessels, to which the absorbents of the skin are so immediately related.

THE inward use of the waters indeed is well adapted for the relief of any worn-out or decayed bowel, as when the stomach and guts, and all the chylopoietick powers are to be assisted, which are thereby in a manner bathed, and may succeed without bathing the external body; but if those distempers, and the like, arise from bad blood and juices, occasioned by a want of perspiration, as generally they are,

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then bathing must be added to promote the cure, which otherwise cannot be so soon or thoroughly affected.

WHAT will set this in a clearer light is, That every body, who hath experience of curing the Pox, sees frequently, in some cases, that hardly any inward method and medicine will signify and reach the distemper; and yet, in such cases, the cure is effected by unction. This is a plain demonstration, that there are obstructions in the capillaries removed by the immediate application of *Mercury*, conveyed by the absorbents, when before given inwardly, it could not transmit its powers thither by internal use.

By bathing, the medicinal virtues of the waters are very soon conveyed into the blood: and that they may, and do operate upon it in this way, is not to be denied. Salivation, we see, is brought on by anointing with the mercurial ointment. The quick effects of blistering plaisters upon the urinary passages in producing a stranguary; garlick applied to the feet, and soon smelt in the breath, with many other instances of the like nature, ascertain the exist-

existence of absorbent or inspiring vessels in the skin.

THAT bathing of the head hath been much neglected, and has been intirely laid aside (if ever in practice) amongst the Ladies, appears from their coming to *Bath* with fine dressed heads: but I cannot see the reason of this custom; surely, whoever promiseth himself benefit from bathing, and is desirous to prevent headaches, and sinkings, ought to plunge his head often, during the time he is in the *Bath*, and take care to dry the hair afterwards; this prevents an over-distension of the vessels in the head, which may be occasioned by a greater determinate flow of blood thither from the heat of the water upon the immersed body, and is prevented by often dipping the head. There is likewise a speedier conveyance thereby made of the salubrious effects of the water to the scalp and brain, contributing to promote the secretion of the *Succus Nervosus* into the Nerves. Rubbing also in the time of bathing all over with a sponge or brush, I take to be of great use, for facilitating the passage of the volatile stream through the inspiring vessels.

THE many wonderful recoveries from all paralytick disorders, old fixed pains, leprosies, and all cutaneous distempers, nervous and ligamentary relaxations, in short, all chronick diseases proceeding from an obstructed perspiration, and a lentor upon the juices, sufficiently prove the efficacy of bathing. But as there may be an abuse of the most certain means, and a failure of the best remedy, from a general direction, and by an indirect usage, no body ought to make the trial without proper advice; it being probable from some such a cause, that the general disuse of late years originally commenced, and hath since continued.

SANCTORIUS and Dr. *Keil*, both of them great men, and indefatigable in their physical recherches, have left behind them works ever to be had in admiration by all the sons of the physical profession, as by their doctrine of perspiration they clear up to us points of knowledge, which renders the practice of Physick rational, and more certain than it had ever been before their time. For faults in the insensible perspiration, and sensible perspiration, are more evidently and commonly the cause of more disorders, than any defects in the other
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natural excretions. All the other, taken together, fall very short, in a healthy state, to the quantum of perspiration, as appears from their calculations : But allowing it to be equal only (in these our northern climates) to the whole excretion by stool and urine, it is evident from thence, that more distempers must arise from an obstructed perspiration, than from an obstruction by stool or urine ; and consequently the increasing and promoting of perspiration, must produce a quicker and more certain method of cure in most cases than purging and diuretick medicines. Dr. *Pitcairne*, in his *Dissertation on the cure of Fevers by evacuations*, hath shewn, that in a fever or any other distemper, the cure whereof is to be effected by evacuations, there is a much greater probability of removing them by perspiration than by stool.

INANITION and Repletion may be said to be the two general causes of all distempers, without enumerating all the particular qualities of juices, which do but in great measure arise from those causes ; so that, in truth, all the practice of Physick mostly depends upon filling and emptying, properly speaking. Thus bleeding and purging, diaphoretick, diuretick medicines, and in a word, all things that serve
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to increase the natural evacuations, are comprehended under the latter ; as attenuating, alterative and deobstruent medicines, volatile, stimulating, and incrassating ones, may be reduced to the former. There may indeed, in many cases, be contra-indications ; thus there may be symptoms of inanition, when the case proceeds from repletion ; and on the contrary, of repletion, when it really proceeds from inanition : and in such, a mistake may be hurtful, and of very bad consequence. But these are easily distinguished by an experienced Physician, who accustoms himself to just and exact observations in the course of his practice ; tho' such as have only one method, and one cause for all distempers, can scarce fail of committing enormous blunders in such cases, as well with regard to the cure, as the prognosticks of a distemper. The like mistakes will be made by those who give into hypotheses unsupported by experiments, who found every thing upon Acid and Alkali, particular ferments, occult qualities, and such like extravagancies, or who fancying every particular distemper to arise from a particular sort of food and diet, imagine it only to be cured by starving, or eating by weight, and drinking by measure, as if all constitutions were exactly
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the same. It were to be wished such Schemists would make impartial observations in their practice, without wresting things to flatter their favourite schemes, or else they may do a great deal of mischief to mankind. But to return.

As obstructed perspiration is the cause of many disorders, acute as well as chronick, the cure of such disorders is obvious, *viz.* by depletion, in such methods as the person can best bear, and which the symptoms indicate. But (as I have hinted before) the same method and medicines will not always succeed with different persons in the same case; bleedings and strong catharticks, or even weak ones, will so far disagree with some constitutions, that they shall sometimes suffer more from such means, than from the distemper itself; so that those methods are most eligible, that are able to remove the distemper with the least danger, and of as little trouble to the patient as possible. Of this nature are gentle vomits and bathing in most curable chronick cases proceeding from an obstructed perspiration. In acute cases we must often have recourse to quicker methods, because in such there is no time to be lost, in regard of their sudden transi-

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tions, and nature likewise can generally bear a push better in them, than in other cases. But still we must act with caution, in such manner as not to precipitate any of the natural discharges, and in no method but what is agreeable to experience, and hath been found successful in the recovery of persons in the like cases: of all methods, none hath been more effectual, and none (I am satisfied) can be used with greater safety, than that of cuticular discharges by perspiration.

How many instances have we, both at sea and land, of the recovery of persons in fevers by immersion in the sea, and cold water, which never failed of forming a crisis by a profuse sweat. But as this discovery owes its rise to the dictates of nature in the sick, expressing his longing desire to be so treated, I do not recommend it as a method to be followed in general, but where they are bent upon it to have it done; but I mention it to shew the great usefulness of promoting sweating; and that as an obstructed perspiration is either primarily or secundarily the most common cause of distempers, so the promotion of it is the most common way of removing and curing them.

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THERE are innumerable examples (some of which most people must have learned) of the most extraordinary longings in fevers, who being indulged in them, have received their cure, by falling afterwards into sweating. I am certain of several men being dipped in the sea, and never without success, when it was found their inclinations bent that way, from their ravings and talking, and even some of them would get out of bed to throw themselves over-board; and some have actually been drowned upon such an occasion, when their watcher has been out of the way. I have known a servant boy recover, (that used now and then to taste of his master's bottle) and the crisis form by sweating, from drinking near a pint of Brandy, which his master indulged him upon his calling out for it in his delirium. Dr. *Hancock* hath furnished us with many instances of the good effects of drinking great draughts of cold water in fevers. A Lady under my care, in the coming out of the small pox, insisted upon having a bumper of Red Port, which she at other times disliked, and being allowed it, took the bottle and glass, and filled herself three large glasses, almost a pint, and drank them with pleasure, upon which

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the vomitings ceased, and the small pox appeared, and came out plentifully; she recover'd, and is now very well; whereas, before the small pox, she was under perpetual nervous disorders, low spirits, tremblings, startings, &c. But there is no necessity of dwelling longer on this point of the great use of perspiration, since every reasonable person must be convinced by what *Sanctorius* and Dr. *Keil* have wrote on the subject. It is strange however, that no greater use is made of what they have so clearly demonstrated, and the mode should govern as much in Physick as it does in dress. A leading man in his profession, takes a fancy to some methods of practice; others, out of complaisance to his person, or deference to his authority, adapt the same into theirs. Hence it comes, that the *Sanctorian* Doctrine is so little minded and improved. Hence it comes, that the method of cure by bathing in chronick cases is so much decried, and so generally disused, when heretofore Bathing was the only remedy; some now run upon excessive bleedings, purgings, emeticks, &c. Indeed, a discreet use of one or more of these, as the nature of the case does require, may pave the way with greater security for a plentiful diaphoresis:

phoresis: but it is chiefly from this last, that the cure is to be expected; and if it was more generally promoted in practice, more lives would, in all probability, be saved, than there are.

IN most, if not all inflammatory cases, bleedings are necessary: but it is a mistake to imagine, that all the cure depends upon bleeding. It must be used with proper cautions, otherwise it may kill, which I am afraid it has too often done, particularly in pleurifies, as I have often found, upon being sent for too late, after such abuses had been committed. It is well known to every body, that in such cases the blood is fizy, glutinous, and highly inflamed, and that there is a painful stitch in one side or other, affecting the breath, proceeding from an obstruction, whence follows an inflammation of the *pleura*, with a spitting of blood, when the lungs are affected, and a full, hard, and quick pulse. These are symptoms which demand bleeding, to lessen the quantity of the blood, that the *impetus* in the small vessels may be increased, in order to remove the obstruction, and to carry on the circulation in the inflamed part, and to form a spitting of the

morbifick, which may be thrown upon the affected parts, and cause an *Empyema*. But yet, if the bleedings are too frequently ordered, regard being had to no other symptom besides the pain, the person must infallibly suffer, and either a suppuration or death ensue; for by emptying the vessels, the contractility of the small ones is thereby destroyed, and the force taken off, by which the obstruction was to be removed, and the fizy matter separated and discharged; whereas if care be taken to keep up the vibrations of the vessels, and *impetus* of blood, by a constant supply of medicated decoctions, apozems and drinks proper in such cases, at least in double quantities to the blood taken away, this can hardly fail of success, if the person be, in all other respects, strong and sound, as I have very often experienced. There is still another observation in these cases, that the pain is not so much to be regarded as the pulse, and the difficulty of breathing in order to regulate phlebotomy. For as is the fulness and hardness of the pulse, so is the distemper, either upon the decline or continuance, and as such, a pulse is a certain attendant in all those cases; so a soft one, with a free breathing and spitting, prognosticates a cure, and the pain goes

goes off intirely, followed with a very thick water, which during the existence of the distemper, was high-coloured and clear.

I cannot upon this occasion forbear mentioning one, which fell under my care: A young Lady, fifteen years of age, and to that time often sickly and ill-coloured, was seized with a pleurisy. On the 4th Day I was sent for, and found her exceeding ill, with all the symptoms usual in such a case very strong upon her. On the 8th, when I expected she would die, upon the application of a *fotus* to her pained side, the suppuration which was formed, broke in less than two hours thereafter, with a noise to be heard by the attendants, she crying out at the same time, that she was easy, and that something like cold water went across her from the place which had been the seat of the pain. In short, she voided in a few days the pus by urine, and continued to do so to the quantity of a quart; which, after subsiding in the water, I carefully collected. Thus was my intention answered, in giving her diuretick apozems, and the fever, which begun a little before she passed any of the pus, quieted by proper means; she recovered,

vered, and is at this time, fix years being elapsed since her cure, in perfect health.

THERE are several instances I might mention of suppurations in the like cases, caused by mismanagements prior to my being called, who have recovered by coughing up the matter, and are now living witnesses of the facts: the case above-mentioned is very remarkable: that which follows is not less curious. A Farmer in the country, a robust strong man, from a violent fixt pain in the region of the liver, and a symptomatick fever, wasted exceedingly for upwards of two months that it continued. After a great many prescriptions to no purpose, he was prevailed upon to take a medicine of the Antimonial and Mercurial preparations blended together in a bolus, which created such emotions in his belly with such sickness, that his parents thought he would have died; but the abscess breaking, he discharged it by stool, and the cyst also, as I took it to be, for it was like a piece of sheep's skin. This is now about seven years ago, and the man is as strong and hearty as ever, at this time ready to testify the truth thereof.

BUT

BUT to return and shew that Hypochondriac and Hysterical cases owe their beginnings to an obstructed perspiration, and an irregularity of all the animal secretions: The primary causes thereof are either luxury, too intense and constant study, sloth and laziness, or want of labour and exercise, great and violent evacuations, especially by purging, depressing passions of the mind from disappointments or otherwise; in fine, every thing that produceth a lentor in the blood, and consequently in the other juices, which may interrupt the regularity of the animal secretions and excretions. Any one of these causes may, in the end, bring on all the manifold and unaccountable complaints and symptoms that attend nervous disorders. For, as it appears from what hath been before observed, unless the mutual action and reaction of the fluids and solids, created by the first impulse when life was given, be kept up to the standard of health, a disease must of course ensue; and that falls under different denominations by the appointment of Physicians, according to the different parts affected.

THUS in Hysterical and Hypochondriacal affections; we know them by what is called
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lowness of spirits, an heaviness and dislike to action, fancies and whims, perpetual fears of dying, a continual propensity to tell their own complaints to every one they see ; an imagination so disturbed, as to make the infirm person think he feels every body's sufferings that he hears of ; from all which it is evident, that in these disorders the mind is disturbed, and that the Nerves, and nervous juices, are in fault ; and as the stomach and bowels are variously affected in such cases, especially with flatulency and distention, when they are at their worst, it does appear, that the Nerves of those parts by consent do convey to the brain their uneasy sensations, which affects the mind in such manner as I have said. Thus the stomach, whose inner coat is made up of nervous terminations, as it were from its vellous appearance, would seem to be principally concerned in these disorders, from the pain and spasmodick contractions of its fibres, attended with distension, eructations, scaldings or cardialgies, loss of appetite, obstructions and constipation, frequent *nausea*, and discharges of bile and choler, *borborigmi*, and an irregular peristaltick motion, which keeps the wind or flatulency pent up from going either upwards

or downwards, thereby occasioning a pungent acrimony, that vellicates and pricks the Nerves of the parts, whence arise various complaints from their convulsive motions and contractions, disturbing the whole *Genus Nervosum*, and producing aches and pains in different places, great discharges of a limpid urine, and generally a costive belly; tho' sometimes incommoded with a looseness, which sinks them, and exasperates the spasms; and at other times a continual spitting. This being the case, an universal waste follows, through a want of due nourishment, and assimilation of the little quantity of meat and drink taken in all Hypochondriacal and Hysterical disorders, or Vapours symptomatically so called.

HENCE (as I have said) the causes assigned, or whatever induceth a lentor on the fluids, or lessens the strength and contractility of the fibres, and thereby occasions sluggish and languid circulations and secretions, must of consequence bring on all chronic illnesses, especially Hypochondriac melancholy. Now as this state of body is attended with an irregularity of all the animal excretions, the body must suffer in proportion to the defect of that

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excretion

excretion which was greatest in a state of health, and that is undoubtedly perspiration. The promotion therefore of this excretion is to be laboured by every means that is most tolerable to the disordered person ; and as none is so ready, or seems so likely to produce that effect as Bathing, we are plainly directed to the use of that method. This, with gentle, but continual exercise, and a very few other directions in medicine, (which a Physician may see necessary for some particular complication) will much sooner and surer effect a cure, than all the strict diets of particular things and *far-rago* of medicines, which very often bring on some other more dangerous distemper, than what they are intended to cure.

WHEN the organs of digestion, and all the emunctories concerned in that operation, are affected, as does immediately appear from symptoms, we may assuredly conclude that perspiration is stopped. Thus flatulency and windy distensions proceed from a retained perspiration, wind being only perspirable matter retained in the body, and which, acquiring a volatile acrimony in the bowels, raises pains, spasms, and convulsive motions, that stop the
explosion

explosion thereof, as we daily find in Hysterical and Hypochondriacal cases. For viscid, sharp and acrimonious fermentative humours (the production of what we eat and drink partly, and also of what is discharged into the stomach and guts by their glands from a moribific state of fluids, occasioned by what goes before, particularly by an obstructed perspiration, and a bad digestion) pave the way to most distempers, both acute and chronical, incident to men, women and children. Indeed, if we may judge from experience, the seeds of most illnesses seem to spring from the stomach and guts, from whence they are derived, to the blood and other juices, and thence to the solids; so that distempers of either may be as various, as the different combinations of their constituent parts, or the infinite diversity of faces and constitutions.

It may probably be here expected, that something should be said concerning Diet; but as that matter is sufficiently exhausted in the ingenious Treatise of Aliments by Dr. *Arbutnot*, I shall add nothing to what is there said; only as he says, that wholesome and unwholesome are relative, not real qualities, we

may justly infer, that there is no affirming a particular thing to be wholesome or unwholesome, without describing the subject in all its circumstances to which it bears those relations. For different food and drink are requisite for different intentions, and are to be ordered as different constitutions of persons require; some one, some another kind of aliment; some more, some less in quantity. A weak, lax fibre, discovering debility, will require food and drink directly opposite in quantity and quality, to a strong, rigid and elastick state.

HENCE appears the absurdity of eating and drinking by weight and measure, and the inconveniencies that may attend the prescribing of a vegetable and milk diet indiscriminately to all persons and in all cases alike. Indeed, in several cases arising from a saline acrimony in the juices, the distemper, after proper preparations, may be much mended by such a diet, with the white meats and drinking of water. But this is to be ordered in such a manner, and no longer continued, than it answers the intention of sweetening the juices; and as no other method will do so well, with this or the other man, it is then only necessary
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and to be tried : since by other means the same may be effected with less danger to the constitution ; for if this regimen be long continued, and is strictly a vegetable and milk diet, there is no returning to a flesh diet, without using the utmost caution. As from a vegetable diet, there is so much danger of destroying all the natural powers, and of falling into the worst kind of fevers, such as are hardest to be cured, from the loss of strength and an universal relaxation brought upon the fibres by such a diet ; so, whenever a sweetening regimen is followed, it must be managed only in such a manner, as that the person, when well, may return to a more strengthening diet without any danger, which may be done with as much effect, as can flow from the strictest milk diet towards a cure, and that is, by now and then eating some solid meats, of such a nature, as do not contra-indicate the intention of a cure by milk and vegetables. For a long and strict milk diet does so relax and weaken all the chylopectick powers, as well as the whole solid fabrick, that it is not to be wondered at, if the least alteration to a freer diet should raise such dangerous tumults in the constitution as to endanger life.

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HENCE also appears the necessity of continuing in such a course, if once entered into, in all its strictness. This necessity is so great, that unless the patrons of such methods can from examples make it evidently appear to be the only method of cure in the case in question, no man ought to advise it in any. For even supposing the immediate distemper to be removed, yet this being done by a strict milk diet, an universal weakness is thereby brought upon the body, lowness of spirits, and many other ill consequences, enumerated by Dr. *Cheyne* in his Essay on the Gout, p. 18, where the danger of abstaining from flesh, fish and wine is so strongly represented, and confirmed by examples, that it is hard to deem a man in his right senses, who should enter into such a diet, after all that is said upon the danger of it by the Doctor, whose authority in this respect is not to be doubted. Nothing certainly can be more erroneous, than to resolve the causes of all distempers into eating flesh or fish, and drinking wine moderately, for all excess is out of the question: Did these naturally tend to destroy health, God Almighty would never have indulged us the use of them. But the case is far otherwise; for eating and drinking
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with moderation, and at regular hours, of such things as are found agreeable to our constitution, and are in themselves, by the general consent of mankind, allowed to be wholesome, is, with a right use of all the Non-naturals, the only Rule for Health, Strength, and Long Life.

END *of the* ESSAY *on the* N E R V E S.



A
DISSERTATION
ON THE
G O U T.

PEOPLE of all ages above puberty, especially the Males, are liable to have the Gout; women less than men, and children less than women. This distemper may be either regular, Spring and Autumn; or irregular as to those Seasons, and happen at any time, conform to the quantity of gouty Matter bred, and the differences of the weather.

THE Symptoms of the Gout are violent, shooting pains, in any of the joints, with swelling and tension on the part, as the distemper increases, which causes an external superficial redness, inflammation and fulness in
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the cutaneous vessels : all which, after a certain time, conform to the degrees of it, remit, and are removed without any other alteration in the part to some, then leaving a tenderness and weakness, for a little time : but in greater degrees of it, contractions, losing the use of the joint by ossifications, chalk-stones, &c. are the consequences.

THE Vessels of the body are Arteries and Veins which carry Red Blood, the serous vessels carry the Water or Serum which is finer and thinner, the Lymphatics contain a Fluid still finer than the *Serum*, and the Nerves secrete what is most refined of all the juices. These are the Orders of Vessels by which all the secretions and excretions of the animal body are carried on, and motion and heat are the two powers employ'd in the combinations, assimilations, cohesions and fluidity, necessary for the preservation of animal life, and continuation of the circulation for those separations and evacuations mentioned.

ALL animal food hath salt and earthy particles in it, with which the Blood must be impregnated ; and the superfluities are washed off and thrown out of the Body, by the excretions

cretions of perspiration, urine, stool, &c. and those are promoted by the proper action and natural attrition of the solids, in the first, second, and third digestions. Such are the conditions in general, by the appointment of nature, for health and long life.

ON the contrary, the condition of the fluids, for want of due attrition and division, must produce various disorders, create obstructions, the foundation of all chronick distempers. So,

THE condition of the fluids from overaction, and too great an attrition, is productive of all acute diseases, hæmorrhagies, colliquations, &c.

THE heat and warmth of animal bodies is preserved and increased or diminished by the motion of the fluids, which is communicated by the action of the heart, and thence to each vessel, bowel and fibre, including the whole composition: Therefore heat being an effect of motion or action, the degrees of it will be in a proportion to those of action, and the degrees of fluidity of the juices proper for all
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the animal offices to be performed, will be also in a ratio of those two jointly.

FROM an adventitious heat in too great a degree, as by strong liquors, fire, and rays of the Sun, an inflammatory state of fluids will happen, from the same action of the solids; for the potential heat of those will so rarefy and expand the juices and air within us, as to stimulate quicker and stronger vibrations in the canals, which in the end will increase to that pitch, as to occasion a fatal coagulum, by the waste and evaporation of the watery and most fluid part: for tho' accidental heat in a tolerable degree will make the blood more fluid, yet in an excess, every person knows, it will in the end have the reverse effect.

THESE points being premised; the Gout, then, is a humour attended with violent pain, which does not suppurate, notwithstanding of the obstruction and inflammation, as in Pleurifies or Phlegmons, which proceed from an obstruction of the sanguiferous vessels; therefore the seat of the Gout cannot be in them. Rheumatick anasaruous Tumors or Swellings likewise never come to supuration; so the
ferous

serous vessels, and the more watery secretions, must be the conveyers of gouty humour from the blood. Chalk-stones and the concretions observable in gouty people's joints and flesh, discover what the gouty Matter is, and the excretions of Perspiration, Urine, &c. discover an abundance of such matter, as salts and earthy particles. It is the intimate mixture and dissolution of such particles, with the watery and serous part of the blood, that carries them through the fine strainers in order to be excerned; and where that due combination and cohesion with the serous part is wanting in those particles, they will separate from the fluid in those vessels too soon, before they arrive at the excretory ducts, and consequently will furr and adhere to the sides of the vessels, or concrete and petrify, wherever they chance to rest. This accounts for all petrifications in animal bodies whatsoever, and verifies the seat of the Gout to be in the serous vessels.

THE doctrine of Attraction teaches, that all liquors are more or less fluid, according to the greater or smaller cohesions of the particles, which swim in the watery Menstruum; and it is likewise evident, that no secretion or excre-

excretion is performed without a mixture and cohesion of several sorts of particles in the liquid fecerned or excerned, as appears by microscopial observations.

If the particles which attract one another, are more powerfully attracted by those of the fluid than by one another, (as in the case of Salts dissolved in a large quantity of water) they can never separate from the fluid of themselves: but the contrary happening, those particles of matter united with the fluid, will run together, and thereby increasing in their gravities, and becoming specifically heavier than the fluid, must settle and stick together in clusters, where the force of motion and heat is not sufficient to keep them asunder, and no intestine motion happens amongst themselves, as in the case of effervescence and ferment; for a constant, equal, progressive motion, whether swift or slow, of a fluid, does not hinder the attractions of particles floating in that fluid much more than if it was in a state of rest; but an unequal velocity of the particles will hinder and disturb their attractions, and by refusing from one another, cause an intestine motion, which prevents their union.

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FROM which it is plain, if the Salts and earthy particles with which the liquid excretions are impregnated, are more attracted by the particles of the fluid to be excreted, than they are by one another, their cohesions and bulks will be so small as to be discharged and washed off in the fluid, by urine, perspiration, &c. and such are performed best when there is a plentiful dilution, an equal circulation, and a moderate heat of blood.

LIKEWISE, if the Salts and earthy particles which are carried out of the blood by the ferous and liquid excretions, are attracted by one another, more than they are attracted by the particles of the fluid, their cohesions will be greater, and their *moles* increased so much, that they cannot go on in the circulation without stopping, sticking to the sides of the canals, dividing and precipitating in the extreme small vessels, before they are thrown out of the body; causing flying, throbbing pains, gout and petrefactions where-ever they settle, and run into clusters before they can arrive at the excretory ducts. This happens for want of dilution, from an unequal circulation, and an inflammatory state of blood.

THE Lymphaticks are a series of vessels carrying a fluid of a cooling, diluent nature, designed undoubtedly to attemperate and moderate the heat and rarefaction of the juices that may happen, thereby keeping up the balance equal in the attractions and cohesions of the different particles, composing the fluids of our bodies, suitable for all the animal purposes, to the standard of health: and the intention of nature for that end is very visible in the great distribution of Lymphaticks amongst the chylopoietick organs or vessels, where they discharge a great quantity of Lymph, to be mix'd with the Chyle, before it mixes with the blood.

FROM what I have said in the foregoing Essay concerning the Nerves, and the nervous Juice, there is no need of repetition; but only shall remark, that relaxation and tension of fibres depend solely upon the quantity and quality of the juices, when they exceed in either case from their natural disposition. The arteries are most elastick, the veins less, the serous vessels less than the veins, the lymphaticks still less than the serous, and the Nerves least of all, if any, as before hinted. Now from these general hints of the Animal Oeconomy,

nomny, every thing concerning the Gout will appear more plain.

PAIN, then, must proceed either from an obstruction or acrimony in the juices: the obstruction arises from particles that cannot pass from their increased bulks, which occasion tension, tearing asunder, and pain: Acrimony arises from the different modifications of spiculated salts, which erode, cut, and burn, causing an acute, scalding pain. All those sensations are felt in gouty pains; and in a fit of the Gout the swelling arises from a flux of serous humors, stimulated to the part, by pain; and the redness or inflammation proceeds from a distention of the blood-vessels of the skin; which symptoms are more or less conform to the quantity of matter and quality lodged upon the part affected, which continue a shorter or longer time, as the matter is in wasting, either by the perspiration of the part, or the prevention of a fresh supply, by being thrown out, or carried off in the excretions: but if the fit is long, and a continuation of gouty matter coming to the part (by not being lessened from the natural evacuations) does happen, then the more solid particles will be accumulated, forming con-

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cretions,

cretions, petrifications and chalk-stones: Thus the vessels are stuffed, crufted, and intirely tore to pieces; the joints stiffened, weakened, and for want of motion, the synovia or juice that serves to moisten the joints, thickens, ossifies or becomes bone, forming an Ancylofis or Orthocolon.

ALL people having bad constitutions, whose secretions are irregular and imperfect, must suffer by an irregularity of their excretions also; and according to the deficiency of either of them that can secrete or discharge most of those superfluities, which are the foundation of gouty matter, so is that constitution more or less gouty; and those people who are regular in going to stool once in the 24 hours, which discovers a regular discharge of Bile, and secretion of the Liver, make water suitable to the quantity of liquor they drink, and have a moderate perspiration, will never have the Gout: And the same will happen, tho' at times by some accident any one of those excretions is deficient, if what ought to have been discharged is carried off by the excess or help of any of the other two. Thus, in case there are no gouty Salts carried off by perspiration, but the urine is well saturated with

with them, and they are voided that way; and in case they are not discharged by urine and perspiration, they may by stool and purgings: and this is the true reason why one has the Gout, and another has not; as one may have a constitution that supplies the defect of excretion by the assistance of another increased, which another man is not so happy to have.

EVERY Physician must know, that of necessity there must be a surplus or redundancy in every constitution, at certain times; and if nature does not throw that off at those times, there must be a distemper or ill health: It is for that reason we observe the increase of one evacuation or other more at those times than usual, sometimes by urine, sometimes by sweating, and sometimes by stool, &c. and nature, in that view, has appointed a periodical one in women by the *Menses*, and sometimes in men by the hæmorrhoides; which certainly is the reason they have the Gout seldomer, if they have it at all, than those who have not that natural benefit.

ALL the excretions of animal bodies have solid particles contained in them, of different
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natures and figures, as is evident from the sub-
 fidences and evaporation of the humidity or
 fluid; and those differences appear in different
 places, from their smells, stains, and taste:
 and these qualities differ in most constitutions,
 conform to our food, things taken, and the
 habit of body. The urine discovers great quan-
 tities of such particles, upon settling and break-
 ing. The insensible perspiration and sweating
 brings away a great deal, and what is voided
 in particular places, as in the feet, axilæ, and
 pudenda, &c. discover it to be of a very vo-
 latile and rank nature. The Saliva or spittle
 is oftentimes very salt, and the acrimony and
 sharp pains about the Anus in going to stool,
 proceed from the salts carried that way. As
 all the vessels of animal bodies are conical,
 decreasing in their branching off and conti-
 nuation to their ultimate divisions, for the se-
 cretions of different fluids that arise out of
 the blood; so a serous and lymphatick vessel
 must be of the same dimensions in every per-
 son, to secrete serous juices and lymph; for if
 they were larger than the smallest blood-
 vessel, their secretion would be red and bloody,
 and the excretions also, which can never hap-
 pen but when the blood is too much rarefied
 and dissolved, so as the red globules can enter
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them : hence the reason assigned for one escaping the Gout, and another having it, to depend upon the differences of the sizes of the vessels, and stiffness, is without any foundation, either from Anatomy or Animal Oeconomy ; and unless the seat of the Gout was in the greater or sanguiferous vessels, (since with respect to them they may be of different magnitudes in different people) the notion is chimerical and absurd. Now, as this distemper always attacks the joints, where the vessels are very small, the gouty matter can only lodge in such vessels, and the obstruction cannot be in the blood-vessels, since the humor of the Gout never suppurates ; therefore the seat of the Gout must be (as mention'd) in that series of small vessels which can only admit the serous and watery fluids, and these must be the same and alike in every body ; for what is a serous vessel in one, must be of the same dimensions and flexibility in every one. Since then the watery and thinnest secretions are impregnated with salts and light terrestrial particles, being water is the proper diluent of such substances or matter, it remains no question if they are not carried out of the body, but there must be foundation for Gout and gouty complaints, left behind.

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It is observable, that all gouty people are bloated and look yellow, of a fallow complexion; this is owing to the serum and lymph being impregnated with too much bile, which shews a defect in the secretion of the liver, and a redundancy of gall or bile in the mass of blood; which, not being excreted naturally, or discharged in urine, must necessarily produce such a colour in the skin, and gouty complaints. The petrifications in the joints, gall-bladder, and urinary passages, bear a great analogy to one another; tho' indeed all those animal fluids may be subject to petrify in any part of the body, which are full of salts, and earthy particles, when subsiding, and suffered to unite for want of heat and motion. People cough up stones from their Lungs, and I have seen two stones taken from under the tongue, one in a woman, of the bigness of a horse-bean, and the other, of a transparent yellow colour, from a man, resembling a barley-corn: books are full of examples to this purpose.

THE true reason of the Gout arising from what has been said, and why it should discover itself, first in the extremities, is owing to the circulation being more languid in them

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than

than in other parts; and as the seat of it is in the smallest vessels, from the same reason the motion must be less in them there than in other parts; likewise, the extremities being more exposed to the external air, and consequently more subject to be chilled or cooled; and having less natural heat in them, for want of a brisk circulation, the gouty matter must of course precipitate in them sooner than in the vessels of any other part that is not so remote from heat and impulse. Stagnations from gouty matter, when it abounds in quantity, do happen in the small vessels of the viscera, from a languid circulation also, tho' they are in a warm situation; and this arises from a greater viscosity of the juices than in common fits; which is always the consequence of much gouty humor: and those causes still are greater when it is in the head, where it commonly is mortal.

THE Gout is a true crisis of such a state of juices falling upon this or the other part, according to accidental causes, diminishing or affecting the performance of circulation in those parts; and therefore the extremities are more subject to its first attacks, as being susceptible of more of those causes than other

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parts : and as want of exercise, and a sedentary life, begets the gout, so the confinement during a fit, and an inactivity of body, which it generally brings after, from weakness in the joints, &c. forms more matter, and introduces the constitution to be ever after subject to the distemper ; which is one reason why there can be no absolute cure for the Gout, to one that has ever had it strongly. But if that vulgar error did not prevail so much, as to have nothing to do with a physician during the fit, from the notion that there is no need of one at that time, I dare affirm so many miserable objects (as now daily occur to our observation) of all ages, could not be produced : and this assertion I found upon reason and experience : for when should a man apply for relief of a distemper, but when he has it upon him ? This fault or error must have arisen from the misapprehension of the nature of the distemper, and accidents from bad advice. But men should consider that this distemper is a crisis or effort of nature, to get rid of what the blood is overcharged with, (for reasons already given) since the natural excretions were not sufficient for that purpose to discharge the cause ; and that the true way, consequently, is to follow the dictates of nature, in giving such things,

things, without disturbing her, or to help her, in promoting the work she has begun, which is discover'd by the distemper. This is certainly the method in all other cases; and there can be given no solid reason against it in this.

THE method, then, is, to administer such medicines as will promote the excretions of the gouty matter properly, in such a manner as not to translate or fix it, when there is a true fit; but to lessen the quantity, and prevent the growth of more matter, particularly at such a time when the juices are in a condition to precipitate or disjoin it, as happens during the fit.

THE doctrine of attraction before-mentioned explains that state of Fluids, which occasions a fit of the Gout, or prevents it; yet considering all the animal powers necessary to carry on the secretions and excretions, for health, I must beg leave to be more plain and particular on that condition of juices, when the fit comes. And this crisis happens at those times, when the serum of the blood is so much impregnated with gouty matter, (which it has received or washed off from the

red blood) that the particles of the matter, exceeding in their attractions of one another, and cannot be kept asunder by the powers of circulation then existing in those parts, must cohere, and, as it were, precipitate, causing a fit: for if the serum were not so much impregnated, the resistance arising from cohesion of the particles of the fluid, exceeding the specifick gravity of the particles of the gouty matter, will prevent their settling or precipitating, and there will be no fit of course: for a precipitation is occasioned by a subsiding of particles, that float and are suspended in a fluid, and will be, or not be conform to the resistances of their cohesions, and the differences of their surfaces mutually. But this is commonly understood of a fluid at rest; as we see by the settlement of urine, when cold; yet notwithstanding, in the circulation there is motion, and thence heat, necessary to thin and lessen the cohesion of particles, for the due performance of particular secretions, as well as excretions; and that motion being equal, but more languid in particular parts, such as the hands and feet, or elsewhere in the smaller vessels, cannot preserve the mixture without suffering the grosser or heavier particles to separate, subside, or precipitate: for if
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the cohesions are lessened, and the moles increased before they arrive at the excretory passages to be washed off, they must stop in their way, forming obstructions, pain, tumor, petrifications, and all the gouty symptoms. A small particle of matter adhering to the sides of any tube, will insensibly grow bigger in the course of a moving fluid, and in time will obstruct the tube, if it is not washed away; so in animal tubes the same will happen, if the impulse is not sufficient to rub it off, and protrude the particle; hence all petrifications arise in the human body.

FROM all which it is plain, that a constitution whose fluids are full of gouty salts and matter, and cannot discharge them by the excretions, (from the reasons assigned) must suffer in the distemper; and where-ever the circulation is most languid, there the gouty matter is more at freedom to settle; that smallness of particles well diluted, is what will carry them through the small vessels, till they are excreted; that too great heat and viscosity will prevent the matter from being sent out of the body; and the juices being in that condition, will occasion vagrant and shooting pains, and inflammatory disorders: that
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the true Gout is a critical discharge or separation from the fluids, in the small serous vessels of the points of salts, and chalky particles, which could not cohere long enough in the fluids, till they were excreted; and also that the organs of secretion and excretion may be faulty in their performances, and create a gouty Plethora: that irregularities in our eating and drinking, either in quantities or qualities, will bring on such a state of blood as breeds the Gout: that a sedentary and lazy life will do the same; in fine, that constitution of body, where the secretions and excretions are imperfect, let him live any how in point of regularity and exercise, must have a tendency to the Gout: and the contrary constitution, where there are strong parts, and due natural excretions, will upon every occasion get rid of the load, either by urine, purging, perspiration, or other discharges, being increased as nature requires; let him eat, and drink, or live as he desires, he will never have the Gout, so long as the organs of excretions are able to perform their offices duly and naturally; being in this state, they are always ready to relieve the body from every incumbent load, and which our bodies are so liable to from the vicissitudes of human life.

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It is undeniable, that all the juices of the body partake of the nature of our aliment, tho' they are variously altered in the composition of the different fluids which exist in a healthy person. We cannot discover an acid, nor an alkali, truly speaking, in any of them, while they circulate in the vessels; neither do I suppose such qualities can possibly be (beyond the *primæ viæ*) discovered; but that there may be a disposition more to one than another in animal juices, when in a state of rest, or near to it, is very evident; there is no altering of the muriatick salt; where-ever it is in the animal juices, it will always discover itself in them at all times to the taste, excepting in the *succus nervosus*; (and certainly it is there also, tho' not discernible; for nature does order it thus, that as sea salt is the greatest resister of putrefaction, our juices might be less liable to it, in case of accidents in life, to occasion it; therefore the muriatick or sea salt never alters its nature, let it be modified never so by the secretions and dissolutions of the animal body, it will always be the same: and likewise acid and alkaline juices are never to be found distinctly beyond the *primæ viæ*, while they are in motion; but in a state of stagnation they may discover such qualities, as they are more

or

or less of an acascent or alkalescent nature; and painful tumors and putrefaction will insue, conformable to the nature of the acrimony, and the seat of the obstruction, whether in the blood-vessel or *Serum*.

PUTREFACTION proceeds from alkalious juices, and acid or briny juices resist it; but as sea salt continues the same unaltered; and where they abound, as in sea-scurvies, &c. they will burst the capillary vessels, and cause erosions, pustles, the chymosis, &c. We can only reason analogically on those qualities of acid and alkali being within the animal; for one can never experiment it in them, to make a plain discovery, as is perceived from the conjunctions of an acid and alkali together, where a plain fermentation and ebullition immediately arises: For as Physicians know that all acid medicines thicken the juices, and create a more languid circulation than what ought to be in a healthy state, so they dispose the fluids to put on an acid acrimony; and as all alkalious medicines thin the juices, and accelerate their motions above the standard of health; on the contrary, dispose the fluids to put on an alkaline acrimony. But this way of reasoning, altho' sometimes it may be of use,
yet

yet it comes very short of what is necessary in physical explanations, with regard to the animal oeconomy, in point of truth, and right information: So, whether the gout is owing to an acid or alkali, is of no moment (were we certain) towards finding out the method of cure. Therefore, from what is said before, and being founded upon the doctrine of attraction, concerning the state of the fluids in a gouty constitution, and thence arises a stiff or a lax fibre, will afford greater information and certainty than any reasoning upon other principles can do. And as the fibres which are endowed with elasticity, may be more or less so in a morbid state, and consequently may hurt the secretions and excretions thereby; I consider a lax and stiff fibre only as the effect of different disorders in the fluids; and since every physician's curative intention cannot be established on any other footing than rectifying the juices, which will certainly remove those faults in the animal oeconomy that caus'd the distemper (if curable); what use then is there of so much speculation concerning a lax and a stiff fibre, when medicines can only affect the fibres, as the juices are altered or made better? My saying the fibres are lax, and they must be braced, can mean no more than,

I must use such methods in medicine as to alter the juices in such manner, as will have the effects of making the person strong, and of taking off the cause that prevented the fibres from performing their offices, by their natural intrinsic elasticity: for nothing under a solution of continuity can destroy that intrinsic property of a fibre, but an error in the fluids will suspend it, or relax it; and when that cause is removed, the fibre will return to act in its natural state. The consequence or effect of a first cause is too often taken for the distemper, and very frequently occasions mistakes in practice, and the prevention of cures that might be made. The Gout, for instance, brings upon a person all the symptoms of relaxation; therefore the general opinion is against warm bathing; but considering that this state of relaxation is only a suspension (as now said) occasion'd by viscid inactive juices, furring and sticking to the sides of the fibres, preventing their intrinsic powers of contraction from acting; we shall find that Bathing in warm water is absolutely necessary for a cure, since by its heat and dilution it will most readily carry off the cause, by thinning and dissolving those cohesions, which will accelerate the circulations, and promote

promote all the animal secretions and excretions, whereby the fibres return to their natural tone, and health is restored. Paralytick disorders discover all the signs of relaxation; yet the success attending such cases by bathing in the hot springs of *Bath*, proves what I have said to be true in fact; and where Bathing has been tried in gouty cases, and under proper directions, as I have experienced, it proved alike successful. Many other cases that fall under the doctrine of a lax fibre, and from which bathing in the hot Baths has been thought dangerous, may be cured by such means: numbers of common people find great relief and short fits in the gout from bathing, and even during the fit: but as I would not be understood literally, that, without doing any thing else, bathing will answer; (for I am very sensible, a great deal of mischief has followed bathing improperly; and possibly such accidents have put it under discredit of late years) therefore, as there is such a dissimilitude of constitutions, and consequently in one and the same distemper, what may cure one, may destroy another; for which reason no person ought to fall in with a general hint given, and follow such a method, without the advice of an able and experienced physician, who

can direct him in the proper way, for preparing his body before he makes the essay in bathing; and also during the time while he is under that method, such symptoms may arise and commonly do, as require the skilful hand to set to-rights; and when they do happen, it is often the reason given for leaving off, and consequently preventing a cure; whereas a due attention to the symptoms or complaints that may arise during a course of bathing, indicate the use of such remedies, as may perfect a cure, if steadily prosecuted. It is very certain, there are a great many prejudiced against Bathing, which upon enquiry is founded upon accounts that are not to be regarded; or from accidents that happen by mismanagement and bathing improperly: for as there may be danger, even from the most salubrious means, without due care and attention of the physician, in most cases, particularly in the Gout, it is necessary to give the following Observations.

First; As bathing will certainly open and widen all the capillary vessels and outlets, and thereby the pent up gouty matter, that either cohered to the sides of the vessels and ducts, or totally obstructed them, (if not petrified) will be
loosened

loosened and dissolved; part of which not being carried off by sweating and perspiration in bathing, but mixing with the juices of the body, may be translated, and if not evacuated by proper ways, may produce bad disorders by subsiding and fixing upon some of the viscera, or occasion, if not disjoined from the blood, a fever of a bad kind, and what I call, a gouty fever.

Secondly; That no person of a gouty constitution, whose viscera are weak and unsound, the symptoms and appearances suggesting reasons of suspicion they are in that condition, ought ever to bathe; and also those who have laboured under much gout, and are above fifty years old, should be well advised, before ever they make the attempt; for this reason, because their bodily powers are much impaired by the distemper, and in that stage of life the tone of fibres cannot be so easily restored (if at all) to perform their offices by the assistance of medicine, in case any accident happen from bathing, as I have mentioned; for youth and natural vigour will cooperate and bear the assistance of medicine towards a recovery, which, when gone, the
body

body will sink, and be apt to flag under the necessary operations of it to have any effect.

Thirdly; All those who have impaired their constitutions by living too low, as in a milk and vegetable diet, run a great risk by bathing in the hot springs : for a perseverance in that diet does so weaken all the animal powers, and induces an alkalescent state of fluids, which occasions such a relaxation and putrid softness in all the solid frame, that they can bear no effort or violence of any kind without bad consequences. This, as it explains the true reason for the danger of returning to a more free diet afterwards ; so it also affords a reason why any external impulse which happens from bathing, will be attended with danger to a person, in such a state of fluids and solids as a vegetable diet produceth. I might mention other cases where bathing is not proper ; but what I said may suffice ; since no one ought to bathe without proper advice, and saying more might perhaps induce some to attempt it rashly of their own accord, by which fatal accidents may happen, and thence may arise a dislike of a most salubrious practice ; for the unjudicious, right or wrong, are apt to
blame

blame or applaud the last remedy or means used.

Now, when a gouty person bathes in the hot baths, and is in a course of it, he ought to take such alterative and deobstruent medicines, in such a direction, as will contribute in a proper way to the evacuation of the gouty matter which is disjoined, and set in motion; and in such a manner as he can best indure, or his condition of body will allow of: for as all gout is owing to excesses, and a defect of the animal excretions, by which the matter would be discharged, were they not in fault; so of consequence, from what has been said, the method of cure is obvious of such as are curable, and the mineral sulphurs are the medicines which do most service in such cases, duly combined with other medicines, as the intention of the physician directs, or he sees most suitable to the case, by making them more purgative, diuretick, and diaphoretick, &c. Such a method will certainly dislodge the gouty matter, and restore the gouty person to health, if the case is favourable, and in so far may be termed a cure, as well as the recovery from any other distemper is called so:

so: for tho' there are some stages of this distemper incurable, yet there are others that may be said to receive a cure, as the symptoms are mitigated, the fit shortened and cured, and the frequent relapses prevented: The inevitable accidents to which human life is liable, put it out of the power of remedies to go further than curing for a time in most distempers; so it is in some stages of the gout. Then, conform to the vulgar opinion, that there is no cure for the gout, can only turn upon the *Latin* verse,

Tollere nodosam nescit medicina podagram.

END of the Dissertation on the GOUT.

A
DISSERTATION
ON
DIGESTION,
AND THE
Diseases of the STOMACH
and INTESTINES.

FROM the Stomach every creature receives a most sensible pleasure, or a most exquisite pain and uneasiness; from eating and drinking what is proper, in the first case; or from hunger, load of humours, and prejudicial things taken, in the second case: And since the office of the stomach is first concerned in the preservation and support of the animal body, by digesting the aliment, provident nature saw it necessary that

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it should be endowed with such a distinguishing sensation, to be pleased or offended, as it were, with what might be conducive to the well or evil being of the animal. For what tends to health, the stomach receives agreeably, and digests it; but the contrary causes sickness and pain, with vomitings, in order to get rid of it.

It is matter of no small surprize to some, that the stomach, considering the structure, as it is composed of membranes only, should continue unworn out so long as the standard of life, notwithstanding the loads of solid and fluid aliment daily received, and its continual action upon those, sufficient (as one would think) to destroy or wear out what was much stronger, in a much shorter time: but as this surprize perhaps may arise from a notion that digestion is performed altogether by the muscular force of the stomach, or trituration; yet the contrary appearing in the sequel, will be more satisfactory, and better understood.

THOSE that advance Trituration for the only cause of digestion, demonstrate the absolute power of the stomach to be equal to the pressure of 117,088 pound weight; to
which

which if they add the powers of the diaphragm, and muscles of the abdomen, which are conducive likewise to digestion, then the sum will amount to 250,734 pound weight: such calculations, however curious, do not convince, nor do they make the point clearer than the doctrine of particular ferments did, which the mechanists thereby intended to explode; but as there was no want of a power exceeding a mill-stone to grind, nor particular menstruums and ferments to dissolve in the performance of digestion, if they had consider'd the power of water and heat upon solid alimentary things, with a little agitation, and the expansion or rarefaction of the air contained in the aliment, they might have very naturally accounted for digestion, and from thence have given a most rational explanation, as it is now generally received. By the peristaltick motion of the stomach, the aliment is moved and agitated, which mixes and combines the different dissolved parts of it into a crude fluid, before it is expelled into the intestines; where mixing with the gall and pancreatick juice, it undergoes a second and finer digestion, before it can enter the Lacteals: so far is muscular motion concerned in digestion, and so much was necessary to

complete it. The famous Mr. *Boyle's* invention shews, that flesh and bones, with a little water, are turn'd into a jelly, by the compression of rarefied air confined in the digester; which operation proceeds from the heat expanding the air contained in the pores of the flesh and bones: so mastication, the saliva, the juices secreted in the gullet and stomach, with the liquids we drink, and the artificial or innate heat of things, together with the warmth of the stomach expanding the air, is sufficient to destroy the cohesions of all the little particles of aliment; and the motion does blend and intimately mix those together, which perfects the digestion of the stomach.

THE situation of the stomach is very warm, lying immediately under the midriff, and surrounded with the short ribs; the liver covers part of its right side, and the spleen touches its left: the gut *colon* lies under its bottom, and the *omentum* or cawl being fixt to it, from right to left, hangs over it, with the *Aorta* and *vena cava* behind it. This warm situation indicates, that nature designed such a heat as is necessary for digestion, to be always subsisting and at hand, considering how liable the
 stomach

stomach is to be chilled by the free ingress of external air, and cold things taken down.

THE Structure is framed of four distinct membranes or coats; the villous being the inner one, is composed of short fibres, standing perpendicular upon the next coat, which is intirely nervous, as appears from the *papillæ* discover'd by *Ruyfch*; the third is muscular, compos'd of strait and circular fibres; the fourth arises from the *peritonæum*, and all the blood-vessels lie immediately under it. The Nerves are supplied by the *par vagum*, or the eighth pair of Nerves. This general description of the situation and structure of the stomach will serve to clear up the following part of this Discourse; a more particular one may be found in Treatises of Anatomy. I shall only add that the inmost coat is much larger than the rest, being full of plaits and wrinkles, and full of glands, continually discharging themselves into the cavity; and there is a considerable *plexus* of nerves in the upper orifice, with many other ramifications, which gives it that exquisite sense every one feels upon taking disagreeable and hurtful things.

SELF-

SELF-preservation is implanted in every living creature; and it is from this principle that all our care and industry cometh at first for the support of a pleasant life, without the pain of hunger, or want of things necessary for our well-being: Starving is a most painful death, and a very hungry man can think of nothing so much at the time, as satisfying his hunger; and if it exceed, all the other passions and enjoyments are suspended in the pursuit after food. Thus the desire of food and nourishment may be accounted the first passion, exemplified in the new-born naturally, and excited by the love of life in those more advanced in years, and the hatred every one has to that which gives uneasiness or pain, and what may tend to a dissolution in the end: all this proves what an immediate communication there is between the stomach and *sensorium*; how necessary it is for health that this bowel should be in good order, and what distresses upon the constitution in general distempers of the stomach must bring: and in fine, as it has the first office for the support of the animal body, it is conclusive that it will share in all cases that tend to the destruction of it.

ALL

ALL the passions of the mind affect the stomach: Anger will in some excite vomiting, and grief will totally destroy the appetite; surprises of all kinds will affect the stomach differently, as the constitution is; in some one way, in others another: These are observations, not more easily to be accounted for than the other affections of the soul upon the body; but since they serve to prove, that as the mind affects the stomach, so the disorders and cravings of the stomach affect the mind mutually; by which we may conceive an uninterrupted intercourse and harmony betwixt the brain and the stomach, in a state of health, as well as the contrary, in a state of sickness: and also we may learn from thence, that the true seat of all hypochondriack and hysteric disorders is in the stomach and *Primæ Viæ*; since no bowel or any other part of the body affected does produce symptoms any ways like to those of vapourish people, in whom we find the mind suffers always as well as the stomach.

HUNGER is a sensation proceeding from an empty stomach, or some astringent acid humor bracing and hardening the *Villi* of the inner coat, whose stiffness, with the motion of the stomach, stimulate the nervous *papillæ* immediately

mediately under them, into that feeling which we call hunger. Now fulness or want of an appetite proceeds from a load of food, or viscid ponderous humours, bearing down, soaking and relaxing those *Villi*, by which the opposite sensation upon the *papillæ* is conveyed to the brain, and that impression continues upon the *sensorium*, until the load or weight is removed either by digestion or vomiting.

HUMOURS of different qualities may be formed and composed in the stomach, and those are in conformity to what we eat and drink, and the mixture of the saliva and juices of the stomach, from whence acrimony of all sorts may arise, conform to the nature of all these joined together, and the degrees of heat in the bowel itself. They may be hot, acrid, sharp, saline, thin, oily, cold, viscid and ponderous, and each of them may partake of an acid and alkalious nature, as it happens: the irritations of the stomach, and its quiet, depend upon the different combinations of those qualities; and as the excesses are in either of them, so are the sensations and effects producing a greater or lesser degree of distemper or disorder.

THE

THE Saliva and Juices secreted into the stomach by the terminations of vessels in the *tunica villosa*, and the nervous *papillæ*, (as I have demonstrated in the foregoing Treatise) arising from the mother fluid the blood, must of course be charged with whatever morbid quality it partakes of. Hence disorders or errors in the blood, and *succus nervosus*, must affect the stomach and guts, according to the qualities and quantities of such juices secreted in them. Hence no distemper can happen from an evil state of blood, but the stomach must in some measure share or be affected with it. Thus we see in Fevers of all sorts, the stomach is sick, throws up, or hurries down, as in diarrheas or loosenesses; it loaths meat, is in pain, hot, causing a great thirst, can digest or keep nothing but liquids: so it happens in the beginning of all fevers, and most remarkably in intermittents; those symptoms ceasing when the sweat comes on, which puts an end to the fit, and the person enjoys health, until the period is come of a fresh supply being accumulated of febrile matter, capable of stirring up the like tumults. When the case is acute, the crisis puts an end to all those stomachick symptoms, especially if the evacuation falls upon the skin, as by sweating,

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eruption

eruption of the small pox, measles, rash, or any miliary disorder. There is such a continual discharge into the stomach of saliva, lymph, and nervous juice, for the purposes of digestion, that it is no wonder it is and must be affected in all cases proceeding from an ill state of blood. But such cases are purely and properly symptomatical, and can't be numbered with the real distempers of the stomach or bowel itself; and without the proper distinctions between the real and symptomatical disorders be made, a man must blunder exceedingly in the course of practice.

THAT this may appear more plain, it is necessary to make a recital of those distempers which are said to be the real ones of the stomach, and then the distinctions and differences may appear. 1. A want of appetite, and a dislike of meat; 2. A canine appetite; 3. A depraved appetite, and a desire of eating hurtful things; 4. A morbifick thirst; 5. Indigestion; 6. Hiccough, or *Singultus*; 7. An inclination to vomit, and vomiting; 8. A vomiting of blood; 9. A *cholera morbus*; 10. A pain of the stomach; 11. An inflammation, abscess and ulcer of the stomach. The first of these may be either real or symptomatical;
for

for a want of appetite is occasioned by a *sa-burra* of humours, for want of a proper action to expel them, and a relaxation of the secretory passages, by which a load is formed, growing viscid, and clinging fast to the *villi*, which keeps them depressed, soft and relaxed, thereby creating a sensation of fulness, and a dislike to meat, all the same as if the stomach was filled with a plentiful meal: But the same may happen symptomatically from a fever, scorbutick blood, an overflowing of the gall, a bad secretion, or obstructions of the liver, fluxes of all kinds, and all distempers accompanied with pain; which by consent or sympathy affects the nervous *papillæ* and secretion in the stomach; a free perspiration gives an appetite, and when 'tis otherwise, the appetite suffers.

THE Second case is directly opposite; for a voracious canine appetite proceeds from humors of a more active nature bred in the stomach, either acid, austere, saline, or spirituous, which bracing and hardning the *villi*, irritate the nerves and coats of the stomach into too frequent and strong vibrations; and thereby removing too speedily, and so preventing its being sensible of the load that is greedily

thrown down, a continual *stimulus* of hunger is excited: This may be symptomatical from worms, or a saline briny blood; as in hot scurveys.

THE Third being a depraved appetite or *pica*, that is, a desire of eating extraordinary things that are not nutritive, but hurtful; this is peculiar to children, especially the Girls, and arrives from an acrid hot humor, and is a real distemper of the stomach; but may be symptomatical from the *fluor albus*, and obstructions of the *menfes*: The particular longings of child-bearing women, and the consequences, if not satisfied, shew the consent there is betwixt the womb and the stomach, but cannot easily be explained.

THE Fourth being Thirst, may be a true stomach distemper, for want of a due secretion of juices in it; whereby an unnatural heat and dryness is occasioned from the obstruction; but this may also arise from a too great waste of the animal juices, in evacuations of all sorts, the eating of salt, pungent, hot things, and a hot state of blood, as in fevers and inflammatory cases: a phlegmatick person is never thirsty, but when he is hot and inflamed,

flamed, which thickens the phlegm, and obstructs the discharge of it.

THE Fifth distemper is indigestion; and that may arise from many causes, *viz.* from all the powers of digestion being in fault; from a bad formation; from the villous coat being worn out; from particular things that we eat and drink; from too great abstinence as well as indulgence, hard drinking, especially of spirits, all excesses of the passions, scirrous swellings in the *tunica villosa*; and in fine, all the causes of the first, second, third and fourth case mentioned.

THE Sixth distemper is a *singultus* or hiccough, and proceeds from an irritation of the nerves of the stomach causing a sudden spasm in the upper orifice, and communicating it to the diaphragm, the stomach, as it were, rises up (the contracting of the diaphragm giving it more space) to throw out; but a stop is made by the contraction of the upper orifice, which finishes the convulsive motion. An overcharge from spirituous liquor, and a sudden draught of cold, fermentative or brisk liquor, will cause this irritation; flatulency and worms will occasion the same: in such cases
there

there is no danger, and the cure is easy; but where it becomes a symptom, as in fevers, &c. it is far otherwise, and often mortal. I saved a man's life in the 15th day of his fever, with a continual *singultus*, by giving him a vomit. I was called to another, who without a fever, or any visible or sensible cause, was taken with a continual hiccough, which not yielding to all things tried, killed him in four days.

THE Seventh case is a *nausea* and vomiting, which differ only in *magis* and *minus*; for both are a *stimulus* or expulsion upwards, in opposition to the natural one, towards the *pylorus* and intestines, and the contraction begins in the lower part of the stomach; the upper orifice being relaxed and open, gives way to the *impetus*, and the person reaches and vomits. This may be either artificial, as in the administration of medicines and poisons; or natural, as in the case of an overflowing of juices, and indigestion, where by their stay, and heat of the stomach, they acquire qualities that will incite reachings and vomitings; or symptomatical, as proceeding from a bad state of juices in the habit, fevers, gout, plethora of the blood-vessels of the stomach, as
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in breeding and obstructed women, cholicks of all sorts, contusion and concussion of the brain, passions of the mind; and in fine, all things that are disagreeable to our senses; which is a certain proof, that whatever offends the *genus nervosum*, must by consent affect the nerves of the stomach, and also whatever fault there is in the office of the stomach, the nervous *papilla* being affected, the *sensorium* must be affected also, as was before hinted. Sea-sickness, or vomiting from any other unusual motion happening, is only to be accounted for from the consent of the nerves with the brain.

THE Eighth is, a vomiting of blood, which may proceed from a ruptured vessel, or a dissolved thin blood voided by the ducts that before only secreted a limpid juice; and these are occasioned from various causes, both from without and within the animal; as blows and wounds; a *plethora*, as in womens cases from obstructions, and a stoppage of critical evacuations; as in the hemorrhoids, violent exercise and strains in riding, poisons, colliquations, and violent vomitings.

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THE Ninth case is a most violent irritation, so as to cause excessive vomiting and purging, with pain and inflammation, causing intolerable thirst: This proceeds from a most acrid, caustick humour, the effect of indigestion, poisons, or a scorbutick habit of body, the morbifick juices all flowing into the stomach and guts, constantly stimulating a discharge upwards and downwards, until there are no juices left to carry on the circulation, and death ensues.

THE Tenth case, which is pain in the stomach, and may arise from all the foregoing causes; but strictly, as a chronick disease, proceeds from flatulency, and a viscid fermentative humour, pulling and tearing, as it were, the villous coat, to which it adheres almost immoveably, and glutinous as the white of an egg, causing an uneasy, heavy pain, with lowness and inactivity. *Case 1. and 3.*

THE Eleventh being an inflammation, may be a consequence of one or other of the foregoing cases; and an abscess and ulcer is the consequence of an inflammation, if it is not carried off. This proceeds also from an inflamed fizy blood, and is attended with a
most

most ardent violent fever, excessive burning thirst, and most exquisite pain, and few recover of it. An ulcer may be caused without an abscess, from an excoriation of the humours, as sharp bile, &c. and poisons, as arsenic, corrosive sublimate, cantharides, &c.

Now having shewn the differences betwixt the real distempers, and what are properly symptomatical, when they affect the stomach, it appears from thence, that external causes, and an unhealthy disposition of blood and nervous juice, are more frequently productive of disorders, than what arise from the stomach itself. And that the real distempers of it only arise from an hereditary debility in formation, an obstruction of the secretory passages into the stomach, and their being too open and relaxed, and also the villous coat being abraded, or worn out, and made smooth; but as the stomach cannot be long in this condition without the blood and other juices of the body altering, the effects will be soon felt in the stomach from such an alteration; and then the case becomes complicated into a real and symptomatical one, from the effects of crudities, or bad digestion and foul blood.

FLATULENCY or wind in the stomach and guts is a most general complaint, and when spirituous and hot, occasions spasms, which prevent its discharge either upwards or downwards, causing pain, distention, and great oppressions; but when the stomach and bowels are clean, and the wind is not hot, and proceeds from only pure rarefied air, it will pass off with little uneasiness. A warm quick digestion, and consequently strong, will find less inconveniencies in this respect from the strong meats, as of animals full grown, than from those that are more tender; and all cold food disagrees exceedingly with such, from the condensation of the air, which is in great plenty in all such food, fruits, roots, and plants; which, admitting of a greater degree of rarefaction in such constitutions, will distend the bowels violently, and create colick, and great disorders.

EVERY body is subject to flatulency, more or less, according to what they eat or drink, which is more or less full of air, or subject to ferment, from the necessary powers of digestion; but in a state of health it is our own fault, if we don't shun or refuse those things that are most liable to cause it: There is no
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complaint so general as that of wind and flatulency, and none more subject to it than those who have not a regular and free perspiration, because the superfluity and vapour that ought to pass off in perspiration, recoils upon the stomach and guts, and all the secretory outlets appointed for their offices, which being the most ready receptacles of any, when open, are continually secreting their juices in a state of health. This redundancy of humor causes ferment and vapor, and a weighty load upon the stomach, with a sensation of fullness and inappetency, from the depression of the *villi* and viscosity the matter acquires, if it is not discharged by purging, and other evacuations; the humour may also acquire a degree of Acrimony, which will stimulate the nervous *papillæ* into spasmodic motions, and from what was said, will affect the *genus nervosum*. This is the true character of hypochondriac and hysteric disorders; and as the inclemency and inconstancy of our weather in *Britain* must greatly affect our bodies, and hurt perspiration, it is no wonder that we are more subject to those distempers than our neighbour nations lying more to the southward: Luxury, intemperance, turning night into day, as it were; idleness and inactivity,

will have the like effects on the perspiration, and digestive powers. These, of late years, are too much practised amongst us, which occasions the frequency of nervous distempers; whereas the reverse ought to be observed, to obviate the injuries which may come upon us by the weather; and the way to that is, by exercise, and a regular life.

THE intestines beginning from the lower orifice of the stomach, must suffer in all disorders thereof, and by consent of parts, they cannot be out of order without affecting the stomach: thus, as chylication is begun in the stomach, it is carried on in the intestines, as far as to make the chyle fit to pass the lacteals, by the assistance of the gall, and pancreatick juice, which mix with it in the first gut, immediately upon its coming out of the stomach, and very often the gall is pump'd into the stomach by some accidental motion, or by a different duct eating the *pylorus*, which sometimes happens. Hence the distempers of the stomach and guts are nearly similar, only the last are more subject to impressions from the faults of the bile, and juice of the pancreas, which are often the cause of cholicks, as well as bad digestion and ill-conditioned humours
of

of the stomach. These juices therefore, as proceeding from the same original with those secreted into the stomach, *viz.* the blood, what has been said concerning them, will account for the alterations of the bile and pancreatick juices also; and as the book on Aliment (by the worthy Doctor *Arbutnot*) treats on that point, I shall dwell no longer on the subject; since from what is here and there laid down, is sufficiently explanatory for any one skilled in the operations of medicines, and their effects, to find out remedies for cure in all such curable cases; and also to shew how useful and efficacious the drinking *Bath* waters, with bathing in them, may be in all distempers of the *primæ viæ*, or stomach and bowels; which was hinted in the foregoing Essay.

Now from what has been said, it is evident that Digestion is performed by heat, the expansion of air, motion, and fluids; and those fluids are the Saliva, all the juices secreted in the stomach, the bile and pancreatick juice, with what we eat and drink; and all these agreeing in due quantities and qualities without excess of any one, chylification is performed: thus the chyle, or all the nutritious
juices,

juices, is fitted to pass into the lacteals or milky vessels, whence it flows into the blood, by the left subclavian vein, and incorporates with it for all the animal purposes and nutrition.

THAT the stomach is very conveniently situated for the preservation of that heat, so necessary to be preserved against all the accidents which may lessen it, by what we take in voluntarily, and entrance of cold air which we cannot prevent :

THAT the structure of the stomach is strong, very sensible, able to bear the frictions and intestine motions of all we eat and drink with and without excesses, for the space of many years :

THAT hunger will affect so strongly, that to satisfy it we will forego all other pleasures; as want of food tends to the destroying life more immediately, and self-preservation is innate, about which every animal seems most concerned :

THAT the Passions of the mind affect the stomach, and the disorders of the stomach
affect

affect the mind mutually; which proves the seat of hypochondriacal and hysterical disorders:

THAT the sensation of hunger or fulness is conform to the relaxation and stiffness of the *villæ* moving upon the nervous *papillæ*:

THAT the various alterations and conditions of the juices in the stomach and guts are in conformity to what we eat and take in, or to the state of the bowels, and juices of the body:

THAT towards curing and helping the disorders of the stomach, it is absolutely necessary to make a true distinction betwixt a real and symptomatical one; which is plainly and briefly set forth in Eleven Cases: All which shew, that the various complaints of the stomach (if curable) may be assisted by external applications, such as are anodyne and warm, promoting the perspiration of the parts that cover it; for tho' the stomach lies (as one may think) free and distinct from the external coverings of the abdomen; yet experience proving that vomitings may be excited by external means, such as a poltice of Tobacco, &c. demonstrates

monstrates that proper applications externally may be of very great use in many complaints.

OUR bodies are nourished conform to what we take into our stomachs, the digestion, and the excretions; all which acting agreeably to the laws of nature or animal oeconomy, preserves the body in health, and good plight: on the contrary, as is shew'd before, with regard to the aliment and digestion, so a defect in the excretions by stool, or distempers of the intestines, do destroy or put a stop to those natural good effects: As for instance, if costiveness exceeds, or various kinds of fluxes happen, colick, pains, spasms and tendencies to inflammations, from pungent putrid humours, with what uneasiness and trouble is the person affected; and what waste and destruction follows upon the body for want of nourishment!

To treat of the distempers of the intestines very minutely and particularly, would require a longer description than my intended brevity will permit me; as my purpose is only to give such hints concerning them, to shew the usefulness of drinking and bathing in the *Bath* waters, to those that are afflicted with such
distem-

distempers. The Intestines, then, are composed of one long tube, beginning from the lower orifice of the stomach or *pylorus*, and ending in the *anus*, commonly six times as long as the body to which they belong, connected to the edge of a membrane called the Mesentery, in a manner very curious; the diameter of which does not exceed many inches: they are composed of three coats, as Anatomy discovers; the inmost is made up of short fibres, bound or joined together by blood-vessels of the finest order, and the length of those fibres are as the thickness of the gut, plainly to be seen by injecting the mesenterick artery with warm water, which makes them divide from one another: This coat contracts the gut in the same manner as that of the stomach, and being much longer than the others, forms plaits, and an uneven surface, which are called *valvulæ conniventes*; in their upper edges are placed the orifices of the lacteal vessels, that the chyle being retarded by these wrinkles or valves, it may the more readily enter them: there are numbers of glands discharging a liquor, which undoubtedly serve for a farther attenuation and dilution of the chyle, and preserving the mouths of the lacteals patent and open; by lubricating and

washing off the solid particles of excrement, that may stick and obstruct them in their way downwards, and thus forming also a regularity in going to stool. The second coat is made up of two orders of muscular fibres; the one running length-ways, and the other more spiral than circular, which performs the vermicular or peristaltick motion, and expels the *fæces* or excrement, and wind: the third, according to Anatomists, comes from the membrane that lines all the inside of the belly, and is named the *peritonæum*: The extraordinary sensibility of the intestines discovers them to be full of nervous expansions, which are not discoverable by the naked eye. See *Ruyfch*.

ANATOMISTS, for distinction sake, have divided this long Tube of the guts into six different ones, and those into three small, and three great: the small are in their order from the stomach, the *Duodenum*, *Jejunum*, and *Ilion*; the other three great are the *Cæcum*, *Colon*, and *Rectum*. The first is pierced by the common gall duct from the liver, and the duct from the *Pancreas*, or sweet-bread, which mix their juices with the digested food coming out of the stomach. It is remarkable, that the *valvulæ conniventes* describe greater segments of
of

of a circle, and are nearer to one another in the small guts, than they are in the great ones, where they are broader and at a greater distance from one another, only serving, as it were, to sustain the weight of the *fæces*, and preventing their sudden expulsion. The *Jejunum* has more lacteal vessels than the *Ilium*, and is almost always found empty: this gut, by its circumvolutions from right to left, lies in the region above the navel; the *Ilium* possesses all below the navel, and is the production of ruptures, and the *volvulus* or iliack passion: from this immediately begins the *Cæcum*, which, like the finger of a glove, looks like an appendage to the *Colon* to which it is tied; it has no outlet, but what goes into it must return the same way. The *Colon* being the second great gut, begins where the *Ilium* ends, and is the largest of all the intestines, which ascending by the right kidney, passes under the lower concave part of the liver, often tinged yellow with gall, and tied thereto; then under the stomach, to the spleen on the left side, and left kidney, to both which it adheres, and so terminates at the upper part of the *Os sacrum* in the *Rectum* or last gut. In the beginning of the *Colon*, upon account of its erect position,

there is a very strong Valve, to prevent the falling back of the excrement, and its strength is particular with cells, which serve to support the great load of excrement, that receives its first form there, and prevents its quick descent into the last gut. This situation shews of what great use clysters are in distempers of the lower belly and intestines. The *Rectum* or streight gut is next, and ends in the *Anus*; it is attached to the extremity of the *Os Coccyx* behind, and to the neck of the bladder in men before, and in women to the *Uterus* or Womb: it has three muscles belonging to it, the *Sphincter* and the *levator ani*; the one to shut it, and the other two to open it.

THE causes of disorders in the guts are as other causes falling upon this or the other part of the body, when they proceed from a morbid alteration of the humours; but as in the bowels, *viz.* the stomach and intestines, there may arise disorders immediately from our aliment, and things taken in, without an error in the juices of our body, which are easily comprehended and found out; I shall only mention those that proceed from faults in the bile and pancreatick juice, and a relaxation

laxation or stoppage in the intestine glands, with the consequences of a hereditary bad structure in them, as well as the acquired one from a bad constitution. The first then is the Colick pain; the 2d is Astringencies or Costiveness; 3d is a Diarrhæa; 4th a Dysentery; 5th the Hepatick flux; 6th a Loentary; 7th the Iliack passion; 8th is an inordinate desire of going to stool, or a *Tenesmus*; 9th Worms; 10th Hæmorrhoidal flux and pain.

I. THE Colick pain, upon considering the description of the gut *Colon* before-mentioned, will appear to be a most common distemper, both from its length and valves; and also as it is the receiver of almost all the dreg or excrement, which by remaining too long there, often is the cause of pain. Hot and sharp, or cold and viscid humours, are the common causes of Colicks, wind proceeding from indigestion, which lays up in the intestines causes of fermentation, with the bile and pancreatick juices, and also with every thing we eat and drink, keeps the belly ever distended and blown up, unless it is expelled by the *Anus*, or Belching; but if by hard excrement the *Côlon* is stuffed, and the wind cannot pass, it will create pain in different parts

parts of the belly, as the direction of the gut, and where the stop is; conform to the pungency, volatility and acrimony of the humour; and this humour may be either an acid or an alkali, of an innocent nature; or a caustical one, either thin or viscid: so as the humour is, the pain is more or less violent, either by distending, or, as it were, rending the part, if fixt; or if moveable, by excoriating and inflaming, thereby causing violent gripes or spasms. Costiveness almost always attends this distemper, strictly speaking, otherwise it coincides with one of another name: when it is owing to hard excrement in the upper part of the Colon, the pain is fixt until that gives way: stones either bred in the guts, or swallowed down, balls of worms, &c. stopping, will have the same effect; but when it proceeds from humours, and is truly bilious, which is evident from the vomitings of a yellow, green and rusty or iron colour, the pain will be more shifting and unsettled: sometimes it may be mistaken for a nephritick colick, the pain being fixt in the loin, from a distension of that part of the Colon that is generally attached to the left *Uterus*: but as a true bilious colick receives more relief from the vomitings, than it would do,

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was it a nephritick one, this observation may prevent the mistake. There are several others, necessary for the distinction, such as, the vomitings are more violent in a bilious colick, with surprizing discharges of bile; the pain is more fixt, and being in the Ureter, will extend itself to the *Testes* of that side; the appetite is more affected in the true colick, for eating makes it worse, and has no bad effect in a nephritick one, and there is greater relief from vomitings and excretions than in the gravel colick; the urine is thick, high colour'd, a quick pulse and great thirst in a bilious one: but in the beginning of a nephritick colick the water is clear and thin; without any feverish symptom attending the person, but what may arise from its continuance.

ALL colicks, as they occasion pain, affect the nerves of the intestines; but there is a colick truly nervous, proceeding from a fault in the *succus nervosus*, and obstructions in the *papillæ nervosæ* of the intestines: this is most violent, from the spasms or convulsions that arise in the guts at times, and remits or continues from time to time variously, for years, wearing out the person, or ending in a palsy, either particular to some part, half palsy, or whole.

whole. The dry belly-ach of foreign countries is a kind of this, the men being only subject to it; for the women are more temperate than the men. There is also a colick peculiar to women, which is called hysteric: this is nervous, and arises from a spasm or cramp-like convulsion in the womb, which is to be felt often like a hard ball, in one side of the belly: this, by consent of the nerves with the guts, causes pain in them, and colical symptoms: So from what is said, and conform to the general acceptation of the word colick, which signifies every disorder attended with pain in the bowels, they are divided by Physicians into bilious, flatulent, nervous, hysteric, and nephritick; and the cure of them consists in emollient Lenitives, Carminatives, the warm effluent Gum Medicines, and Diureticks, Phlebotomy and Opiates, as there is occasion; and the tepid Bath is of the greatest use: In fine, a regular course of drinking of the *Bath* waters, and proper bathing, will cure and prevent a relapse, joined with exercise, and a right use of the non-naturals. But this method is only of use in those chronical cases where it is not perpetual, constant, and owing its rise to indigestion, and periodical influences of bad juices, from a Cachexia, or ill habit of
body;

body; for when it is violent without intermission, quicker means must be used, and perhaps even then the person can only be reliev'd from his misery by death; which may be prognosticated from want of evacuation, restlessness, delirium, hiccough, cold sweats, chilness in the limbs, and a regular pulse; which last is a sure sign of the mortification being begun: Those that escape in a severe bilious colick, often have the jaundice, gout, epilepsy, and palsy.

ASTRICTION, or a costive belly, is often the cause of colick pains, and proceeds from a hot state of blood, the want of due secretion of the liver, and the intestinal glands, when people enjoy their health in this case; as I have known some in their common way have but one stool in eight days, others a fortnight, without any uneasiness; it is owing to a strong, stiff state of intestinal fibres, an indolent life, and a languid peristaltick motion: but when it becomes a distemper, attended with great pain and compression of vessels, an inflammation comes on; and if not timely remedied, is of the greatest danger. Phlebotomy and emollients, or gentle openers in clysters and broths, are the successful means.

INTESTINAL fluxes of all kinds have their different names ascribed to them by the Ancients, according to the nature, colour and consistence of the stools. Thus in a Lientery the aliment comes away by stool as it went into the stomach; in the cœliack passion it is crude and imperfectly digested: in a diarrhœa the flux appears only humoural: in a dysentery the flux is bloody; and the hepatick flux is a great discharge of serous and bloody stools, like washings of flesh: But as all fluxes may be more compendiously treated under the two names of Diarrhœa and Dysentery; *viz.* those that are without blood being a species of a Diarrhœa, and those that are bloody being a species of a Dysentery, I shall only mention them in that manner.

ALL kinds of Diarrhœas have their rise, either immediately from what we take in, that is purgative or stimulating of the nervous *papillæ* of the inward and first coat of the intestines; and that cause may be either medicinal or accidental from our diet; but the many sorts of Diarrhœas, as they are distempers, proceed from our juices being over-pregnated with stimulating salts, which fall, or are determined more upon the intestines than other parts;

parts; and in such a state of fluidity as to flow by the intestinal glands into their cavities, causing a Diarrhœa with different symptoms, as the component parts of the juices are of different constitutions: for tho' the discharges of the liver, pancreas, and the other glands into the guts are too abundant, yet the qualities of the juices of different persons occasioning those discharges, are only in fault, if those bowels or glands are sound, and not the primary cause of the flux, as sometimes happens in colliquative ones, from abscesses and ulcerations. Every physician in this light, by reasoning upon the cause and symptoms, may determine the cure (if curable) of all Diarrhœa's.

A Dysentery or bloody flux is a kind of hemorrhage, and proceeds from a too rarefied blood, which is more particularly determined to the mesenterick artery, and which is always over-distended in such cases. This distention occasioning a separation of the *fibrillæ* of the first (as was observed from injecting the artery) must cause violent pain and torture, frequent stools and a tenesmus, and in the end loss of substance, mortification and death. In all fluxes the common excretions are much, if not

totally, diminished while they last, and none so remarkably as that of Urine and the Saliva; for a great thirst always attends fluxes: The cure of fluxes depends chiefly in a due attention to the causes and state of the fluids; revulsion by bleeding, epicacua-na-vomits, and gentle evacuations, by toasted Rhubarb, with astringents and absorbents; a decoction of the *Sima Ruba*, or in powder, with the *Decoctum Chartaceum*, is of singular good service in most fluxes. Opiates combined with these or the like, as the skilful Physician shall see proper, are absolutely necessary to quiet and soothe the racking pain that is common in those cases, as well as restraining the fluxion.

THERE is very often an inflammation attending a Dyfentery and hepatick flux; and such a state of blood generally occasions a feverish pulse: being too busy with Opiates, does often mischief, and vulnerary astringent clysters are attended with success in very bad cases.

THE Iliack passion, *Miserere*, or *Volvulus*, is a folding or doubling of the gut within itself, like the finger of a glove, which happens in other guts as well as the *Ilium*, and
seldom

seldom admits of a cure. The pain is most exquisite, and fixt in one part, from the total stoppage it creates; most violent bilious vomitings accompany the distemper, and what ought to be discharged downwards, is often thrown out at the mouth, by an inversion of the peristaltick motion. Balls of lead, and great quantities of quick-silver are given in this case, but to no purpose for most part; and I apprehend the readiest way to unfold the gut, must be by inflation from Tobacco smoak, or the like; (which Dr. Sydenham has hinted) for, as clysters cannot reach it, nor distend the gut in such manner as to remove the doubling of it, inflation and smoak may, in the manner as we see a bladder in such a situation blown out.

A Tenesmus, or an inordinate desire of going to stool, without much evacuation, or any at all, proceeds from pungent, or viscid, slimy humours, vellicating and stimulating the sphincter to open, as if there was a load of fœces lying upon it: this always attends bloody fluxes, and mostly other fluxes, as the acrimony of the humours are, and is cured with the distemper; but when it is a complaint purely arising from erosion in the *Anus*
and

and *Rectum*, soft, mucilaginous clysters with chalk and lime water, &c. perform the cure.

WORMS are bred or hatched in the guts of people of all ages, and without dispute their *ova* are carried in with the aliment: there are three sorts of them, generally speaking, found in the intestines; the round, or earth-like worm; the flat, or jointed worm, and the *Ascarides*, or white short worm: but observation shews sometimes, that there are worms bred in human bodies of particular figure, not in the least like to any species yet known. Children are mostly subject to the round worm, and they will cause feverish disorders and voracious appetites in them, and a cachexia, or bad juices: the jointed worm is not common, but the *Ascarides* are for most part to people in years. Crude Mercury and all its preparations, destroy worms; the *semen Sanctonicum* and the Coralline have also the same effects; but the *Ascarides*, when they nestle between the coats of the guts, are not so easily destroyed. I have known clysters of mercurial water and coliquintida perform the cure, when I have had reason to think there were nests of them within the first coat.

A Hemorrhage by the hemorrhoidal veins, if moderate, is of the greatest service for the preservation of health, and keeping a person free from many bad distempers; as *Hippocrates* in his *Epidemics* and *Aphorisms* mentions: But an immoderate flux is as dangerous as the other is healthy, by bringing on a train of evils; which arises from the same cause as other great hemorrhagies, either too much blood, or a vitiated quality: in this condition the person languishes, loses his strength, and becomes ill colour'd, as if he had the jaundice, and a dropsy comes on in the fatal stage. Revulsion by Phlebotomy, and all the incrassating and astringent medicines are in this case to be used; the *succus urticorum* with the *Stypticum Helvetii*, in draughts, &c. with a course of *Bath* waters, under the direction of a Physician, will infallibly get the better of such a distemper.

THE Piles or hemorrhoidal pain proceed from a swelling in the terminations of the vessels in the *intestinum rectum*, and they become varicose, full of pure or serous blood, often occasioned by catching cold in the part, or limbs: They are indolent sometimes, and also being inflamed, they will cause great pain:

pain: Heat and fomentations will make them subside, and sweat out the humour, and present relief comes upon their breaking. If they composthumate, a Fistula often follows. There are several kinds of them described by authors; and they take their names from their similitudes and likenesses: Some are internal, others external. Bleeding and gentle emollient purges; anodyne external liniments; fomentations; *Æthiops Mineral* taken in sufficient quantities; and *Lac Sulphuris* with *Bath* waters, are of the greatest use in all hemorrhoidal swellings.

THERE is a distemper which may be called the Hemorrhoidal Colick, and it is known by a pain that is fixed about the termination of the *Colon*, and beginning of the *Rectum*, sometimes occasioning a stranguary, and a most uneasy sensation about the *Anus* and Sphincter-muscle; with costiveness, and a feeling as if there was a great load pressing those parts: this proceeds from a plenitude and over-fulness of the blood-vessels in those parts, and is presently relieved by the bleeding of the Piles; and when that does not happen, leeching those parts will answer the end. This is often mistaken for a nephritick colick;

lick; for as the Colon in those parts is often attached to the left Ureter, symptoms do arise that are common in such cases; but the urine in this colick is very high-coloured, and the pains or load about the *Anus* in particular in this, which is not in the other.

End of the Dissertation on DIGESTION.

Z

A P P E N-

APPENDIX.

FROM the general good reception the foregoing Treatise has met with in the world, I am encouraged to join to this edition, (which I hope will not be unacceptable) an account of some Alterative Medicines, which I have used with success in Chronical cases; and, as their uses and operations are agreeable to this theory contain'd in these foregoing sheets, and that they may be properly given with a course of *Bath Waters*, I have added by way of proof a few Cases, to shew their power and efficacy.

ALTERATIVE Medicines are of the greatest use in the practice of Medicine, and there can be no extraordinary performances effected without them; the virtues of the *Bath* springs are truly Alterative; and the great relief and many cures daily appearing in this place, are sufficiently confirmed and

made manifest by the constant resort of people of all ranks and distinction. In this respect the *Bath Waters* become exceeding good coadjutors and vehicles to Alteratives, more powerful and efficacious for promoting and hastening a cure, which could not be so soon performed without them.

I am very sensible this method of practice has been pretty much neglected for want of due consideration and insufficiency of the common remedies used, from their slow operations, and the harshness of others, as in the case of salivation: In the first, the sick have not patience to undergo it; and, in the second, some are not able to bear it; and the constitutions of many are torn to pieces by it: Where a mild and effectual alterative remedy is much to be desired; and, until better discoveries are made, I have chosen to make use of the following Preparations as the safest and most certain I have ever known.

It may be here expected, that I should give a particular explanation of Alterative Medicines; but as those are sufficiently understood by the profession, I shall only beg
leave

leave in general to observe, that all such medicines which are of any efficacy, have either fixt or volatile salts combined with oily and saponaceous particles in their composition, or they are ponderous and elastick, friable and diffusive; with these principles they dissolve, attenuate, scour, cleanse, becoming thereby deobstruents, or the Remover of adhesions, and all obstruction; if they are not duly and suitably dosed to every constitution, their effects are felt in the first passages; but if otherwise, they are only experienced in the sanguiferous and smallest vessels.

It is necessary, before the use of alterative medicines, to evacuate or prepare the body in such manner, as is most conducive to the strength of the patient, the plenitude of the vessels, and the load or oppression of Humours: And also a strict regard must be had in the administration of them, to the errors and faults of the excretory and secretory ducts or passages, by blending them with such other medicines, as may more immediately direct their course to those faulty parts.

THE preparation of the sulphur of antimony, as it was made by the *Carthusians*, is, Take two pounds of crude antimony well cleaned from dust, half a pound of the solution of fixt nitre, three pounds of rain-water; all which boil together for two hours; then strain it through a thick flannel cloath gently, which afterwards put into a narrow-bottom'd vessel, and let it stand until the separation of the powder, which will fall to the bottom, of a yellowish red colour, obtained by pouring of the liquor slowly: To this liquor add four ounces more of the solution, and do as before; and so for a third time, by adding two ounces more of the solution, which will separate all the sulphur contained in the menstruum: To all the powder so collected being joined together, and well washed with warm water, until the salts are all carry'd off, which is to be known by the taste: Then add two ounces of the highest rectify'd spirit of wine to the powder, and set it on fire, which after it goes out of itself, dry the sulphur, from any humidity that may remain, upon cap paper.

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THIS is the *arcanum monachorum*, by which title it was communicated to me many years ago; and seems better adapted than that of *Kermes* mineral, under which it has appeared in publick. However, this is a true sulphur of antimony, milder in its operations than any other, with which the Monks did perform surprizing cures in many cases; it is of such a diffusive nature, that it easily mixes with the juices, and will pass the smallest canals; it seldom fails of promoting a plentiful diaphoresis joined with an opiate; it is a great corrector of acrimony and acridities in the first passages. Many authors mention his good qualities, says *Geofroy*, and extol its virtues; such as in the small-pox, and many other cases, of which I have had no experience.

It is not an easy matter to account for the surprizing effects of volatile mineral sulphurs, which accompany the metals in their subterraneous growth: The *gas* of the *Bath* waters, which instantly flies off and evaporates, is matter of speculation, as it cannot be fixt: The effects of the Decoction of quicksilver are, much to be admired, when
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at the same time, tho' you boil the silver often, it will lose little, and most inconsiderably in weight; yet the sulphur being washed into the decoction, tho' so inconsiderable in quantity, is well known to have very good effects; which have made me often think, that all the chymical preparations of mercury do but only rob it of its best properties.

MANY years ago I imagined, that if calomel was so bridled as not to salivate, and thereby become a mild alterative, success would attend its operations in several stubborn cases; and so by combining the *antimonium resuscitatum* with equal quantities of calomel, or two parts rather, I succeeded, and have cured the pox with it, and have used it with great satisfaction in many other cases: I am well acquainted with surgeons of the army that make use of no other medicines in venereal cases amongst their soldiers: But as sometimes I have found it affect the salivate glands; I have laid it aside, since Dr. *Plummer*, my learned friend, has found out a better, which I never knew cause the least soreness in the mouth.

Mr.

Mr. Boucher Chymist in Lombard street prepares it in the following manner, and calls it Panaica Grisea :

Take half a pound of Antimony, and beat into pieces as small as barley corns; then separate the fine dust by a sieve, and put the pieces into a flat-bottomed vessel of Glass; to which put Aqua Regia almost an inch above the Antimony. Let the solution go on without heat, and there appears a sulphureous or pitchy matter swimming on the liquor, and the Antimony covered with a yellow crust. Pour off gently the Aqua Regia into another vessel, keeping back the sulphureous matter, and then wash the remaining Antimony several times, till it has lost all acidity; then pour upon the Antimony oleum Tartari per Deliquium, till it rises two inches: Place the vessel in warm Sand, and increase the fire till the liquor boils; pour out this tincture, and add ol. Tartari as before: To these Solutions while warm, add Acetum Distillatum, till the effervescence is over; place the vessel again in warm sand, and a powder will fall

to the bottom, which separate by a Filter; and dry upon cap paper three parts of this with two parts of Calomel well mix'd together upon a marble stone, is the Medicine recommended by Dr. Plummer.

C A S E I.

Of a LEPRA GRÆCORUM.

MR. Cooper of London, in his youthful days, enjoy'd a very good state of Health, by living regularly, and abstaining from the vices which youth is liable to: But, after he was thirty years old, from a hurry of business, and a sedentary life, he contracted bad health, which appeared in Gout, Leprosy and Piles, to a great degree. In these conditions he fell under the discipline of Medicine by the advice of many, and for near thirty years more he continued in that way without recovery; sometimes better, and at other times worse. He told me, That he had try'd a most strict vegetable diet to no purpose for a long time; and that he was now come to try what *Holt* or *Bath* waters would do under my direction. His appetite to eating was very little, which had never failed before; and

and as he came to *Bath* in *August* 1737, strongly possessed with the virtues of *Holt* waters, I was willing he should try them for a month. Upon his return I found his appetite was better, but his Leprosy not altered; he was blooded, and the serum was very foul, the crassamentum sify and yellow; he took some cooling purges and nitrous medicines, before he began to drink the waters; and in about eight days after, he began to bathe in the Cross, then in the hot Bath, three times a week; and every night I ordered him to take the following pills.

R Panac. Guic. scrup. semis.
Resin. Guaici gran. xij.
Bals. Peruv. q. s. m. f. pul. quaq; nocte
decubitur. sumend.

R Tinct. Antim. Unc. unam Cap. gtt.
in Primo Cyatho Aquarum Therm.
quaq; mane.

This purged him gently every morning, and agreed with him so well, that in six weeks time his whole Skin was entirely cleansed from all its scabs and filth. I ordered him towards the end to rub the affected parts with

the Unguentum Antipforicum mentioned in the *Edinburgh* dispensatory; now and then to have recourse to his pills, and to drink water at his meals, and abstain from all malt-liquor, and salt meats. He is at this time perfectly well of all his complaints, no gout, nor piles; and likely to continue so, as he has done for this year since his recovery.

C A S E II.

Of an EPILEPSIA.

JOHAN DEAN, of *Willo* in *Somersetshire*, near 18 years of age, of a strong make, and well-framed body, being ill of epileptick fits, he had them very frequently three or four times a day; he continuing sometimes one hour in a fit, and seldom was in one, when in bed in the night time: After repeated evacuations, bleeding, head blistering, purgings, and a long course of nervous medicines, such as the Pulv. de Guttela, wild Valerian, and the Peruvian Bark, Cinnabars of Antimony, Sal Jovis, and the warm gums; all this tended to no more purpose in nine Months, than lessening the number of fits, and making them of a shorter duration. Then I ordered the
fol-

following prescription, and by continuing for a month in this method, he is recover'd, and has had no tendency to a fit for these years past.

Pres:

℞ *Panac. Guic. grana vij.*

Cons. fr. Cynosb. q. s.

*m. f. bol. quaq; nocte hora decubitus
sumend. per mensem integrum.*

I have had the experience of curing the Epilepsia Infantum with constant and daily purging; by giving the infusion of Rhubarb, and the absorbent powders with the Sal Jovis, and infusion of wild Valerian; and I usually begun them with bleeding in the foot, and blistering the head, when they continu'd in the fits long, as I have known them do for 7 hours with distorted eyes and mouths.

C A S E III.

Of a Convulsive and Bilious CHOLICK.

MR S. Willis of Bristol, a young lively woman, after her marriage some time, was taken with violent reachings and vomitings of a yellow, green and black bile, at different

different times, attended with excess of pain in her stomach and bowels, which brought on violent spasms. In this condition she had been for nine months, much wasted, and a total obstruction of the menses. Being under the direction of a physician, she had taken abundance of medicines, and told me she was burnt up with hot things, and had drunk a great quantity by orders, of a liquor they call Toddy, which always fuddled her. When she came to *Bath*, I had her blooded, finding her feverish with a quick hard pulse; her blood was much inflamed, and the serum foul with a green colour. She was generally costive, and always thirsty. I ordered her to wash her stomach with the infusion of camomile flowers, at all times when she had the least symptom of her disorder, and with *Sal. Absinthii* mixtures, and gentle cooling Catharticks. Her feverishness left her, and she was able to drink the *Bath* waters in small quantities, with nervous stomach drops in them; and by bathing she mended fast, and went away in six weeks home, to the surprize of her neighbours, healthy and well: But some months after she returned, finding herself relapsing, and an obstruction of the *catamenia* again was likely to happen from
small

small appearances of them at the usual times. Then she desired me, that I would not confine her from her business at home, but to order her such a course of medicine, which she might take in her own house; and it was as follows;

Panac. Gui. grana vij.
Pil. Ruffi. scrup. unum.
Bals. Peruv. q. s. f. pil. pro dos. cap.
alternis noctibus, cubitum itura; su-
perbib. haust. Aqu. Bristol.
Noctibus intermediis cap. seq.

℞ Tart. Regenerat. scrup. semis.
Gum. Guaici. opt. pulv. grana vj.
Pulv. Croci grana iv. form. in pilulas
q. s. syr. Bals.

This method she continued for a month, and is perfectly recovered, having been well for near 16 months.

THE stomach nervous spirit is as follows:

Take of Mastick well picked four ounces,
of the best Succinum or Amber two
ounces, of the Salt of Tartar six ounces,
of the highest rectify'd spirit of Wine
three

three pounds; after a sufficient infusion and maceration, distil the spirit for use.

THIS nervous spirit is of great efficacy, taken with a course of *Bath* waters, in relaxations of the stomach, and hypochondriac flatulency.

A person of distinction was recovered of a true hysterical disorder, low spirits, indigestion, and strong eructations, &c. with the use of the *Bath* waters, bathing, and the following prescriptions :

℞ *Antimon. Cathart. gr. ix.*

Sol. Jovis gr. vj.

Affafetid. scrup. semis.

Ol. Cinamomi gtt. quatuor; form. in pilulas, quas cap. hora somni.

℞ *Arcan. Monach. grana duo.*

Resin. Guaici. grana octo.

Hydrargyr. grana duodecim.

M. una ad extinctionem globulorum, et form. in pil. q. s. Bals. Peruv. quas cap. quaq; mane, superbibendo Haust. aquæ Therm.

IN paralytick cafes arising from a hot scorbutick Cause, the following is of great use, viz. bathing, drinking the *Bath* waters moderately, with the nervous drops as before-mentioned, and taking these:

℞ *Arcan. Monach. grana duo.*
Resin. Guaiaci scrup. semis.
Opii puriss. grana semis.
Syr. Balf. q. s. f. Bol. vel Pil. hora decubitus sumend. superbibenda poculum aquæ Therm.

IF this does not give them a stool in the morning, for such cases are often very costive, this is to be taken in the morning:

℞ *Panac. Gris. grana iv.*
Diagred. gr. iii.
Elect. Lenitiv. q. s. f. Bol. vel Pil. quo magis arrideat Palato.

IN cafes from a cold, viscid pituitous cause, this form takes place:

℞ *Arcan. Monach. gr. duo.*
Assafetid. Pil. Rusi. ana scrup. semis.
B b Balf.

*Bals. Peruvian. q. s. f. Pil. nocte
sumend.*

Or this;

R Arc. Monach. gr. duo.

Pil. Gummos. grana xv.

*Hydrargyr. c. Syr. de Althea extinct.
scrup. unum; f. Pil. c. q. s. Bals.
Peruv.*

IN the Jaundice it is of singular service, given with the sapo and powder of Saffron; and in the Gout, with the Gum Guaiacum and Aloes; when the gouty matter adheres so closely to the fluids, and cannot be disjoined by the operations of nature, so as to form a fit in the extremities, from which various complaints, and general ill health cometh. I never knew a more certain way of forming a fit regularly, or carrying off the gouty humour, by the common excretions, which is evident from the diaphoresis and the turbid urine they generally make with such a method.

IN such cases I have particularly observed, where they have chalk stones, and symptoms of crusted and foul vessels; that
the

the Pain of a fit is less sensible to them, or acute, than to those who have not their vessels in that condition. By repeated fits of the gout, the sensibility and re-action of the coats of the vessels is so altered by the frequent distensions, and the settling or crusting of the gouty matter, that the gouty person cannot feel the attacks of the gout in such a manner as he did at first in the infancy of his gout. Wherefore I say, it is observable in gouty people of long standing, that when the matter is disjoined, and abundance of it set afloat by an alterative method, and cannot be carried out of the body in the common outlets, so fast as the separation comes on; by which means, especially, after exercise, the humour will again settle and produce a regular fit, with all the acuteness of pain of a young fit, or equal to those that have not had many fits of the gout, where the sensibility is not destroyed by a load of congestions.

C A S E IV.

Of an IRREGULAR *and* UNFIXED
G O U T.

A Gentleman of about 70 years of age, having all the signs of good Stamina, and who had been in a long and hard service of the navy, told me that he came to me to give him a fit of the gout; for all his illness he was sure proceeded from that cause: I agreed with him, finding he had usually the gout, periodically, *Autumn* and *Spring*, and was tender-footed from thence; his complaints were sinking, flying pains, and a want of appetite; his excretion by urine was limpid, and sometimes in great quantities, with a costive belly. I prescribed for him bathing of his feet every night going to bed in *Bath* water, and the drinking of them with the stomach nervous spirit before mentioned, together with

℞ *Arcan. Monach. gr. i. & semis.*

Pil. Rusi. scrup. semis.

Resin. Guaiaci gran. vii.

Bals. Peruvian. q. s. ad form. pil.
quaq;

*quaq; nocte sumend. superbib. Haust.
aquæ Therm.*

THIS he continued for six weeks with the *Bath* waters, but no fit of the gout ensued; which did not please him, though he was sensible of his being better in all respects, having recovered his stomach, &c. Though he rid out on horseback at all times, when the weather permitted him, yet he made no complaints (but now and then of flying pains upon alterations of the weather) as if he was to have a fit of the gout; and had none while he was at *Bath*, but recovered his strength and colour, with all the signs of good health, his business calling him to *London*. I told him, if all the gouty matter was not out of his constitution, that possibly he might be laid up a little after his Journey with the shaking of the coach; which accordingly happened to his desire, though he had a smart fit for near three weeks; since, he has continued in the enjoyment of good health, and lively spirits, being almost two years ago. As he has scorbutick appearances, he has recourse to the following prescription now and then:

R Panac.

℞ *Panac. Gris. gran. viii.*

Pulv. Rhei. surup. semis.

Resin. Guaiaci gran. vj.

*Conserv. Aurantiorum q. s. f. Bolus
mane vel nocte sumendus.*

C A S E V.

Of a LEPROA of the HEAD.

A Gentleman of not much above 20 years of age, after the small pox, contracted a thick, dry, leprous scab all over the scalp, but towards his ears there was a weeping of a thin acrimonious humour, which fell also upon his eyes, which afflicted him most. He had undergone repeated trials of *Holt* waters, and courses of physick, to no purpose: I ordered him to be blooded, and to take the following pills, and rub in the following ointment eight days after; to live coolly, and drink little wine, and take great care of catching colds, which always hurt his eyes:

℞ *Panac. Gris. gran. viij.*

Resin. Guaiaci gran. vj.

Zulep. gran. iv.

*Syr. de Spina q. s. f. pil. quaq; nocte
sumend. superbib. haust. vini serosi.*

℞ *Suc-*

℞ *Succi nasturtii hortens. per express.*
unicas 4tuor auxung. Porcin. lib. ss.
Coqu. una ad consist. quo illiniatur
caput.

THE effects of which, in a fortnight's time, cleared his head of all the crust, and the weeping behind his ears dry'd up; yet his eyes continued tender and inflam'd some time after, especially when he was not careful enough, for the sake of his diversions, to preserve them from the influence of the cold winds: however, by now and then losing a little blood, he got well of that sharp humour in his eyes; also with

℞ *Arcan. Monach. grana ij. ss.*
Specier. de Hyacintho. scrup. unum.
Bals. de Cupiva q. s. ad form. pilulas
mediocres, quas capiat mane jejuno
stomacho per mensem.
Tertia quaq; die adde Calomel. gr. vj.
pro ratione operativa.

C A S E VI.

Of a CATALEPSIS.

THOMAS DAWSON was a long time ill, from fits coming upon him of a sudden; which deprived him of all his senses and speech while they lasted, and continued sometimes an hour. He was always aware of their coming, when he felt a particular pain in his legs, sometimes in one only; this he said by a quick transition took away his senses, and tumbled him down. With a long course of medicine he got well, and afterwards was confirmed in his cure by using the Cold Bath. The method made use of in this case, was much in the same way with those mentioned in the Epilepsies.

C A S E VII.

*Of a FIXED PAIN attended with
HYSTERICK FITS.*

A Pretty young woman, of about 19 years of age, had complained of a violent pain for eight days in her left side under the short ribs, which several times a day with
its

its violence threw her into Hyfterick fits: I found no fymptoms of any kind of fever upon her, but a lofs of appetite, and a great dejection of fpirits; many things had been done and given ineffectually before I faw her; I had her blooded in the foot, and gave her Antihyfterick medicines for feveral days, but not much to any purpofe, but that her pain was not fo violent, nor her fits fo frequent, nor ftrong. I ordered her the following decoction, and her pain abated foon after; and before fhe had drunk a quart of it, the fits never returned, and fhe was quite well in a week.

R. Hydrargyr. lib. iv. femin. Anifi fenicul. dulc. una unci. femin. Cardamom. drachm. 2. Rhei incis. drachm. 2. Coqu. in Aqu. font. lib. iij. ad lib. ij. colat. cap. coclil. fex 2dis horis.

It was not a little furprifing to me, to find fuch quick effects communicated by the quick-filver to the decoction, which fo fuddenly removed the caufe of the malady, and which could not be brought about by many other methods; neither fhall I pretend to account for it. But fuch are convincing ar-

guments, that innocent means ought to be try'd, tho' uncommon, when the common methods of practice prove unsuccessful. But such is the reward too often from censorious people, if success do not attend it, that they are loaded with malicious insinuations, industriously spread abroad, in order to destroy their good names and characters: Surely such treatment must ever discourage improvements! Tho' it is despised by men of sense, and below men of honour to do so; yet it is most disagreeable to be the subject of lyes and malice, were they never so impotent.

I could mention many more successful cases arising from the good Effects of these medicines; yet I hope the few cases mentioned will be sufficient to ascertain the Practice: Therefore at present I shall give only one case more, as it was an incurable one, and abundantly curious.

C A S E

C A S E VIII.

Of the GOUT in the STOMACH.

A PERSON of distinction, upwards of sixty years, had for a long time been in a very bad state of health, and with extremity of gout, in hands and feet, was reduced to a very weak condition, and great imbecillity of body; his impatience from the violence of his gouty fits, brought him to apply external remedies to the parts affected, when the fits were upon him, which drove it from his feet to his hands, and thence to his stomach, where his complaints had continued for several years, without being able ever since to procure a regular fit, with the assistance of repeated advice, and consultations of many physicians: I am, said he, in continual pain in my stomach, pointing to the middle thereof: I live upon liquids, and can bear nothing solid, nor any thing strong; chicken broths and milk are what have supported me this long time, and a bowl of new milk always eases my pain. I am subject to vomitings every ten or twelve days, and not so able to bear them

now as formerly; and then I threw up a great quantity of slimy humour, sometimes yellow like gall, and at other times bloody, which the exercise of a coach about these times will occasion. I have of late been troubled, with a frequent making of urine in quantities, and an incontinency, not from any heat, but a weakness, as I apprehend. This is the substance of what he told of himself; but withal added, that at present he was much sunk and ruffled by taking of the *Scots* pills, which his physician had given him before I saw him. When I had consider'd the case, and weigh'd every thing, I was unwilling by myself to prescribe, foreseeing want of success; and that perhaps a quick alteration might happen to the worse in such a wore-out case, which I thought would lay a foundation for calumny. I therefore declining without assistance, as far as good manners would allow: However it not being agreed too, and his saying, as he was sure I would give him no violent operating thing, he was determin'd to follow my advice, and let the event be as it would, I could loose no credit, since he had followed, and had the best advice *England* could afford him; the following prescription was ordered, as

the

the most innocent and easy medicine for all his various complaints; and apprehending his stomach to be in a continual state of inflammation, drinking of *Bristol* water and bleeding was proposed; but the latter was not agreed to, from a suspicion of sinking him, and making him low-spirited.

℞ *Tinct. Ros. Pharm. Edinb.* ℥ j.
Sal. Viperar. drachm. ij. Diff. in
mortario marmoreo, et sig. cujus cap.
cochlearium 1 in cyatho aqu. Brist.
mane et hora 5ta postmeridiana.

℞ *Resin. Guaiaci drachm. ij.*
Hydrargyr. opt. col. unciam i. Levi-
gant una ad extinctionem globul. et
fiat Æthyops.

Hujus Æthyop. gran. x.
Arcan. Monach. gran. ij.
Opij Puriss. gran. semis.
Bals. Peruv. q. v. ad form. pil.
medioc. deaurat. quas cap. nocte
cubit. iturus.

The next morning after taking the pills, he told me with great satisfaction, that his
 pain

pain was gone; he had slept well all night, and that he had purged once very easily that morning. He continued easy all day, and had recourse to his pills at night, which had the same good effects; and so on to the third day, when he said, Now I have continued free from pain so long, I think myself quite well; and indeed, I never desire to be better at this time of life. I am going out in my coach for a little air, and if the shaking does not occasion a return of my pain, I shall still have a better opinion of myself; for hitherto exercise always exasperates it, and makes me worse. After his return home, he told me he wished he had not gone out; for he felt his pain again, and believed he had got some cold: That night, not taking his pills, he did not rest well, and was hoarse and a little deaf in the morning; his pulse was frequent and full, but would not hear of bleeding; he took nothing of medicine all the day, and had a better night and a natural siege in the morning, his pulse was mended, though he had the same symptoms of a cold, and coughed much with a free expectoration of such humour as he usually vomited at his critical times; which he was apprehensive were coming upon him, ten
days

days being lapsed, since the last time when he vomited blood, as he had observed, they returned commonly in twelve or fourteen days. He continued only his usual dyet, and took no medicine but his Tincture, till next day being costive, he of his own accord took his pills, thinking thereby he might divert the return of his vomitings by having a loose siege, or at least alleviated thereby; but that night unfortunately they seized him very severely, not having passage before he went to bed. In the morning he had a plentiful discharge, and was very much out of order, wanting his rest; he had a nausea still upon him, and sometimes a singultus, coughing, and a frequent pulse. He would not lose any blood, nor have any other physician, tho' I earnestly desired it; but his answer was, we will stay till to-morrow; and he consented to take the following draughts:

R. Aqu. Menth. unc. ij.

Sal. Absinth. scrup. i.

Succ. Limon. unc. semis.

Tinct. Specier. Diamber. gutt. x.

*Syr. Carioph. unc. semis. m. f. Haustus
statim sum. et repet. urgente nausea.*

His

HIS reachings and squeamishness were relieved by these means; but he was much dispirited all day, and at five of the clock he became very sick, with a tremor and chillness of body, of which, after he had vomited, and going to bed said, he was very easy, but coughed pretty much with a free expectoration. Bloodings and blisters with an alexipharmick draught were ordered immediately by the physicians called in, and this being about seven of the clock, before midnight he dy'd.

WHEN he was opened, his stomach appeared surprizingly distended, and so very much inflamed, that it was of a blackish red colour, spotted in some places in a mortified manner. The blood-vessels were all full and turgid, and it had the resemblance of a fine injected anatomical preparation, but none of them of a natural size, but mostly varicose, and many of them as big as quills; one of which was very remarkable, and passing into the omentum in a strait line, near three inches in length, was like unto a goose quill full of blood, being shut up at its termination, and having no ramifications

fications, the blood could not retire but by the same way it came in; therefore a perpetual fullness and distention must for most part always have been in it; the omentum or cawl in this part being about the middle of the stomach, was gathered up, and formed a hard thickness, towards the right and left it covered the intestines like an apron, as usual; this place, by what he had discovered, was the seat of his pain, being confirmed the more in it, as I apprehended when pressing the pained part, that I felt an induration or Tumor. The stomach in the inside was perfectly smooth, and much worn, containing nothing but a very small quantity of such humour as he used to spit up: his liver was so much wasted and out of sight at first, that without turning the stomach on one side it was not perceptible; when it appeared of a livid colour, and adher'd most strongly to the side and the diaphragma; all other parts in sight seem'd in a natural disposition, no further enquiry being made, or thought necessary at the time. But here I shall conclude, and only say, *Summa prudentiæ pars est eorum qui a morbis devicti sunt curationem non aggredi, ne temere in-*

200 A P P E N D I X.

famentur ea præsidia quæ multis fuere salutari. “ It is the highest prudence not to
 “ undertake those whom the distemper has
 “ conquered, that such means may not be
 “ rashly condemned as have been salutary
 “ to many.



F I N I S.

